676

1   IN THE UNITED STATES DISTRICT COURT
                     FOR THE WESTERN DISTRICT OF TEXAS
2   WACO DIVISION

3   TEXTRON INNOVATIONS INC.*
                             *   April 19, 2023
4   VS.   *
                             * CIVIL ACTION NO. 6:21-CV-740
5   SZ DJI TECHNOLOGY CO., *
        LTD. ET AL   *

6
                    BEFORE THE HONORABLE ALAN D ALBRIGHT
7   JURY TRIAL PROCEEDINGS
                            Volume 3 of 5
8
     APPEARANCES:
9
     For the Plaintiff: Kurt Pankratz, Esq.
10   Morgan G. Mayne, Esq.
                          Harrison Rich, Esq.
11   Emily M. Deer, Esq.
                          Baker Botts
12   2001 Ross Ave., Suite 900
                          Dallas, TX 75206
13
                          Kevin J. Meek, Esq.
14   Mark A. Speegle, Esq.
                          Lance Joseph Goodman, Esq.
15   Boyang Zhang, Esq.
                          Baker Botts, LLP
16   98 San Jacinto Blvd., Suite 1500
                          Austin, TX 78701
17
                          Mark Siegmund, Esq.
18   Cherry Johnson Siegmund James, PLLC
                          The Roosevelt Tower
19   400 Austin Avenue, 9th Floor
                          Waco, Texas 76701
20
     For the Defendant: J. Michael Jakes, Esq.
21   Qingyu Yin, Esq.
                          Sydney Kestle, Esq.
22   Finnegan Henderson Farabow Garrett
                            & Dunner LLP
23   901 New York Ave. Nw
                          Washington, DC 20001
24

25

677

1   Benjamin R. Schlesinger, Esq.
                                     Robert High, Esq.
2   Finnegan Henderson Farabow Garrett
                                       & Dunner LLP
3   271 17th St Nw, Suite 1400
                                     Atlanta, GA 30363
4
                                     Jacob Schroeder, Esq.
5   Finnegan Henderson Farabow Garrett
                                       & Dunner LLP
6   Stanford Research Park
                                     3300 Hillview Avenue, 2nd Floor
7   Palo Alto, CA 94304

8   John P. Palmer, Esq.
                                     Jacqueline Altman, Esq.
9   Naman Howell Smith & Lee
                                     P.O. Box 1470
10   Waco, TX 76703-1470

11   Court Reporter: Kristie M. Davis, CRR, RMR
                                     PO Box 20994
12   Waco, Texas 76702-0994
                                     (254) 340-6114

13

14   Proceedings recorded by mechanical stenography,

01:29   15   transcript produced by computer-aided transcription.

01:29   16

17

18

19

20

21

22

23

24

25

678

01:11   1   (Hearing begins.)

01:11   2   THE BAILIFF: All rise.

01:11   3   THE COURT: Please remain standing for

01:11   4   the jury.

01:11   5   (Jury entered the courtroom.)

01:11   6   THE COURT: Thank you. You may be

01:11   7   seated.

01:11   8   Thanks to all of you for accommodating my

01:12   9   schedule. We had sentencings this morning. I

01:12   10   apologize for interrupting the trial. It's just...

01:12   11   So I believe I'm going to ask the

01:12   12   defendant to call their next witness.

01:12   13   MR. HIGH: DJI calls their next witness

01:12   14   by deposition, Mr. Jeffrey Epp.

01:12   15   (Video deposition of Jeffrey Epp played as follows.)

01:12   16   Q.   State your name for the record.

01:12   17   A.   Jeffrey Epp.

01:12   18   Q.   Do you understand you are under oath today?

01:12   19   A.   Yes.

01:12   20   Q.   And you understand that being under oath means

01:12   21   you are required to testify truthfully just as if you

01:12   22   were in a court?

01:12   23   A.   Yes.

01:12   24   Q.   And if I ask a question and you do not -- you

01:12   25   do not understand the question, feel free to ask me to

679

01:12   1   clarify it. But if you answer my question, I will

01:12   2   assume that you understood the question.

01:12   3   Is that okay?

01:12   4   A.   Okay. Yes.

01:12   5   Q.   And is there any reason you cannot testify

01:13   6   truthfully, accurately and completely today?

01:13   7   A.   No.

01:13   8   Q.   Do you remember any other UAV-related projects

01:13   9   at innovation group?

01:13   10   A.   Yes. There were some other unmanned products.

01:13   11   Q.   Do you remember the name of those unmanned

01:13   12   projects?

01:13   13   A.   APT was one of them, A-P-T.

01:13   14   Q.   Is there a product for APT?

01:13   15   A.   It was never -- it was never sold or went to

01:13   16   production.

01:13   17   Q.   Is APT being -- what's the full name? Sorry.

01:13   18   A.   Autonomous pod transport.

01:13   19   Q.   Okay. Just based on your knowledge -- first

01:13   20   of all, is it -- was it designed for military use or

01:13   21   commercial use?

01:13   22   Do you know?

01:13   23   A.   Both.

01:13   24   Q.   For commercial, do you know what kind of use

01:13   25   case it was targeted at?

680

01:13   1   A.   Cargo.

01:13   2   Q.   Do you know if there is any potential market

01:14   3   or customer innovation team we're looking at?

01:14   4   A.   I know they were looking for customers that

01:14   5   would, you know, that -- that deliver cargo. I mean,

01:14   6   like I said, it was a transport -- you know, it was to

01:14   7   transport goods. So it was a -- like I said, it was a

01:14   8   cargo transport.

01:14   9   Q.   Any other utility that innovation team was

01:14   10   designing or developing for APT?

01:14   11   A.   Any other utility?

01:14   12   Q.   Any other, maybe, use case.

01:14   13   A.   I know they were planning to use it for a

01:14   14   military cargo transport.

01:14   15   Q.   Okay. So sounds like it's still mainly

01:14   16   targeted for cargo transport?

01:14   17   A.   Yes.

01:14   18   Q.   Okay. For cargo transport, what are important

01:14   19   for the aircraft to perform the function?

01:14   20   A.   It has to have the ability to carry a payload.

01:15   21   Q.   What would be the requirement to carry a

01:15   22   payload?

01:15   23   A.   It has to be able to have a vehicle weight

01:15   24   greater than itself -- fly with a vehicle weight

01:15   25   greater than itself.

681

01:15   1   Q.   So have you heard of relative initial velocity

01:15   2   mode?

01:15   3   A.   Yes. I helped develop that.

01:15   4   Q.   Can you explain the background for developing

01:15   5   the relative inertial velocity mode?

01:15   6   A.   That was for a project where the aircraft

01:15   7   would be landing on a boat.

01:15   8   Q.   Okay.

01:15   9   A.   And that was developed to allow for a way of

01:15   10   controlling the aircraft relative to the boat.

01:15   11   Q.   Before this RIV mode, how did people land an

01:15   12   aircraft on a moving vehicle?

01:15   13   A.   They would just have to fly the aircraft

01:15   14   toward the boat.

01:16   15   Q.   You mean manually control the aircraft?

01:16   16   A.   Right.

01:16   17   Q.   What was the challenge for that conventional

01:16   18   way to do it?

01:16   19   A.   The -- the boat was moving and the -- you

01:16   20   know, the pilot would have to fly the aircraft toward

01:16   21   the boat. And the boat could change directions, and

01:16   22   the pilot would then have to change directions of the

01:16   23   aircraft. And the pilot would have to -- and the pilot

01:16   24   was flying the aircraft in -- in the aircraft axes.

01:16   25   Q.   To control the aircraft to move relative to

682

01:16   1   the ship, what else do you need?

01:16   2   A.   It depends on how well you want it to do in

01:16   3   the job, I guess.

01:16   4   Q.   What do you mean?

01:16   5   A.   I mean, in our case, we were trying to land an

01:16   6   aircraft on a moving boat. So the boat goes up and

01:17   7   down with the waves and everything. So to be able to

01:17   8   do a precision landing on a boat, you know, you wanted

01:17   9   to know the -- the acceleration, you know, of the -- of

01:17   10   the -- of the boat.

01:17   11   You wanted to know the angle or attitude of

01:17   12   the boat so that you could match that with your

01:17   13   aircraft in order to -- to land it on -- on the boat.

01:17   14   If you only cared about relative position and

01:17   15   you didn't care about the attitude of the boat and you

01:17   16   weren't trying to land it on the boat, then you

01:17   17   wouldn't necessarily need that additional information.

01:17   18   You would only need to know the relative position to

01:17   19   command it relative to the boat.

01:17   20   The goal of that program was to be able to

01:17   21   land the aircraft on the boat. Well, you could fly it

01:17   22   relative to the boat but to be able to land it on the

01:17   23   boat. So you need more precise control, and you need

01:17   24   to know the information of the boat to be able to land

01:17   25   on the boat.

683

01:17   1   Q.   Okay. Any other relative motion you were

01:18   2   working on between the ship and the aircraft other than

01:18   3   landing?

01:18   4   A.   Yeah. The -- the modes allowed the pilot to

01:18   5   be able to fly the aircraft relative to the boat --

01:18   6   Q.   Okay.

01:18   7   A.   -- so he could control it in the coordinate

01:18   8   system of the boat. So rather than just flying the

01:18   9   aircraft, basically you're flying a point relative to a

01:18   10   point.

01:18   11   Q.   Is it like following?

01:18   12   A.   Yes. It would follow it or it would fly

01:18   13   relative to the point or the boat. So it may -- it may

01:18   14   follow the boat as is or it may fly with a closing

01:18   15   distance or a decreasing distance or it may display

01:18   16   away from the boat. Depends on what the pilot wanted

01:18   17   it to do.

01:18   18   Q.   I see.

01:18   19   A.   It just flies relative to the boat.

01:18   20   Q.   Do you -- do you need any other data of the

01:18   21   ship other than position?

01:18   22   A.   It depends on how you want to implement it.

01:19   23   And if you know -- you don't necessarily have to know

01:19   24   the position of the boat. You just need to know the

01:19   25   position of the aircraft relative to the boat. So like

684

01:19   1   I said before, if you know the position of the boat and

01:19   2   the position of the aircraft, you can calculate the

01:19   3   distance.

01:19   4   And if you know, you know -- and as those are

01:19   5   moving, right, you can determine the velocity of both

01:19   6   of those or you can have the -- if you know the

01:19   7   velocity of the boat and the velocity of the aircraft,

01:19   8   you know the relative velocities of both too. It

01:19   9   depends on what data's available to you.

01:19   10   Q.   How does the aircraft command itself to move

01:19   11   relative to the ship at the same speed?

01:19   12   A.   It maintains a constant velocity that matches

01:19   13   the motion of the -- of the reference point.

01:20   14   Q.   And then for the closing speed or slowing down

01:20   15   the aircraft relative -- relative to the ship, how did

01:20   16   the flight control system work?

01:20   17   What kind of input does it need and what kind

01:20   18   of output does it generate?

01:20   19   A.   It needs to know its velocity or distance

01:20   20   relative to the reference point or the touchdown point,

01:20   21   and then it commands its velocity --

01:20   22   Q.   Okay.

01:20   23   A.   -- relative to that.

01:20   24   Q.   Commands the velocity -- commands the relative

01:20   25   velocity to a predetermined value or what -- how does

685

01:20 1   it command?

01:20 2   A.   I believe in our implementation we had an

01:20 3   approach mode --

01:20 4   Q.   Okay.

01:20 5   A.   -- which would then preprogram, you know,

01:21 6   maneuver. It would command a velocity, which commanded

01:21 7   a closing distance. It would fly, closing the distance

01:21 8   toward the touchdown point, and then it would slow down

01:21 9   until it got to the -- when it got to the point and

01:21 10   then could hover.

01:21 11   Q.   Sorry. What do you mean by "control the

01:21 12   closing distance"?

01:21 13   It's like a preprogrammed profile?

01:21 14   A.   Yes.

01:21 15   Q.   Okay. Do you control velocity, relative

01:21 16   velocity?

01:21 17   A.   During that preprogram maneuver, the aircraft

01:21 18   controls its own relative velocity on that profile.

01:21 19   Q.   How does the aircraft control its own

01:21 20   velocity?

01:21 21   A.   It basically commands a groundspeed or an

01:21 22   airspeed. And then that -- you know, it knows that

01:21 23   velocity relative to that reference point, and it

01:21 24   closes the loop around that velocity.

01:22 25   But ultimately, I guess, it comes back to

686

01:22 1   commanding a pitch -- a pitch attitude or a pitch rate,

01:22 2   right? You command a pitch attitude or pitch rate of

01:22 3   the aircraft, which command a speed, and then you

01:22 4   have -- the loops are layered, right?

01:22 5   Q.   Okay. So, for example, is it, like, for the

01:22 6   preprogrammed profile that you've just mentioned, it's

01:22 7   a relative velocity of, I don't know, 5. Adds a first

01:22 8   distance which is farther at P1 and then, I assume,

01:22 9   decreasing it to 4 when it's closer P2, is it?

01:22 10   A.   Right.

01:22 11   Q.   Is that a profile?

01:22 12   A.   Yes. It would command a faster relative

01:22 13   velocity when it's further out so it will get closer to

01:22 14   the boat. As it starts getting closer based on

01:22 15   distance, it commands a slower velocity, also commands

01:22 16   altitude too. And then it comes in and slows down as

01:22 17   it gets to the point and then holds over the -- over

01:22 18   the touchdown point.

01:23 19   Q.   So for this profile, that was preprogrammed

01:23 20   prior to flight?

01:23 21   A.   It could be -- I can't remember. Yes. It was

01:23 22   preprogrammed prior to flight. I think it maybe was

01:23 23   also able to be modified by the ground control station

01:23 24   operator during flight.

01:23 25   Q.   Okay. So then for the flight control system

687

01:23   1   on board the aircraft, in order to follow this profile

01:23   2   to control the aircraft, what ship data and aircraft

01:23   3   data does it need?

01:23   4   A.   You could do it with different sets of data.

01:23   5   I believe the data that we used in our implementation

01:23   6   was the -- was the position of the aircraft relative to

01:23   7   the touchdown point.

01:23   8   Q.   So the input is the relative position between

01:24   9   the aircraft and the --

01:24   10   A.   The relative position and relative velocity.

01:24   11   I think we receive both sets of data from the -- from

01:24   12   the UCARS system.

01:24   13   Q.   Does it --

01:24   14   A.   I mean, you can implement it using different

01:24   15   sets of data.

01:24   16   Q.   What do you mean? What kind of other --

01:24   17   A.   Well, like I said previously, if you know

01:24   18   position data of the reference point, position data of

01:24   19   the aircraft, right, you can calculate the relative

01:24   20   distance. You can calculate -- if you know those over

01:24   21   time, you can calculate the relative velocities; or if

01:24   22   you have a sensor that provides you the distance and

01:24   23   the velocity, then you don't need to calculate those.

01:24   24   So -- but the control loops take that

01:24   25   information into account or uses those -- that

688

01:25   1   information as inputs into the control loops. How you

01:25   2   get that information depends on what your sources of

01:25   3   data are.

01:25   4   Q.   Is there any difference between getting

01:25   5   velocity data and getting position data over time to

01:25   6   determine the velocity?

01:25   7   A.   It -- most likely accuracy, depending on the

01:25   8   update rates of -- of each. It depends on what your

01:25   9   update rates of -- of your -- your relative position is

01:25 10   or your relative velocity is or the update rates of

01:25 11   your position information that you're using to

01:25 12   calculate those distances and velocities.

01:25 13   So if the updates are -- update rates are

01:25 14   slow, then you're going to have, you know, large

01:25 15   increments that you're going to be calculating that --

01:26 16   and it could be changing, you know, speeding up/slowing

01:26 17   down in between your data points.

01:26 18   Q.   Does this sound critical especially if you're

01:26 19   maneuvering the aircraft to approach the ship?

01:26 20   A.   The criticality would depend upon what you're

01:26 21   trying to do.

01:26 22   Q.   Could you give an example?

01:26 23   A.   For trying to do a precision landing on a

01:26 24   moving boat -- on a boat that is moving with, you know,

01:26 25   the waves and moving up and down, then you need high

689

01:26   1   frequency information with good resolution.

01:26   2   When you're not trying to land on the boat and

01:26   3   you're just trying to fly relative to the boat, it

01:26   4   doesn't really matter as much. You don't need to

01:26   5   know -- you don't need to know that the boat's going up

01:26   6   and down and moving side to side, you know. You don't

01:26   7   have to follow it exactly. It's when you're trying to

01:27   8   land that you need to match the exact motion of the

01:27   9   boat.

01:27   10   Q.   And so in your case, why did you choose to

01:27   11   also get the velocity data from UCARS?

01:27   12   A.   That was the data that was readily available.

01:27   13   Q.   Okay. So the UCAR already provide certain

01:27   14   sensor to measure the velocity of the ship?

01:27   15   A.   Yeah. The UCAR was an existing system. It

01:27   16   was an existing government-furnished equipment,

01:27   17   existing system they use on boats. And so that data

01:27   18   was available from that system.

01:27   19   Q.   Did you try any other way to control the

01:27   20   aircraft relative to the boat, for example, based on

01:27   21   position of the boat?

01:27   22   A.   I think we may have done that in simulation,

01:27   23   but I don't -- I think we -- like I said, we used the

01:27   24   data that was available to us. So how you get the data

01:28   25   that you use for inputting into the control loops is,

690

01:28   1   you know -- that's independent how you get the data, so

01:28   2   whatever data you have available to you.

01:28   3   I believe in simulation we calculated the

01:28   4   velocities based on positions, but I think when using

01:28   5   the UCAR system, we used the velocity of the boat that

01:28   6   was given to you over the data link.

01:28   7   Q.   Okay. Could you have controlled the aircraft

01:28   8   relative to the boat based on the position of the boat?

01:28   9   A.   Yes. If you know the position of the boat and

01:28   10   you know the position of the aircraft, you know the

01:28   11   relative distance. And if you are continually getting

01:29   12   that data, then you can calculate the velocity of -- of

01:29   13   the boat and the velocity of your aircraft.

01:29   14   And so then, therefore, you can, you know, you

01:29   15   know the relative velocity and you can command the

01:29   16   velocity relative to that relative velocity reference.

01:29   17   Q.   So for -- sorry to interrupt.

01:29   18   A.   So you can command your relative velocity in

01:29   19   relation to that relative velocity reference point.

01:29   20   (Video ends.)

01:29   21   MR. HIGH: DJI calls by deposition

01:29   22   Mr. Bryan Honza.

01:29   23   (Video deposition of Bryan Honza played as follows.)

01:29   24   Q.   Good morning. Could you please state your

01:29   25   name for the record?

691

01:29   1   A.   Bryan Paul Honza.

01:29   2   Q.   Do you understand you're under oath today?

01:29   3   A.   Yes.

01:29   4   Q.   And do you understand that being under oath

01:29   5   means you have to testify truthfully and honestly just

01:29   6   as if you were testifying in court?

01:29   7   A.   Yes.

01:29   8   Q.   And is there any reason why you cannot testify

01:30   9   honestly, accurately, truthfully today?

01:30   10   A.   No.

01:30   11   Q.   Were you an inventor of '909 patent?

01:30   12   A.   Yes.

01:30   13   Q.   Which part of the Eagle Eye project laid the

01:30   14   foundation for the '909 patent?

01:30   15   A.   On the Eagle Eye aircraft, we developed a

01:30   16   relative inertial velocity mode.

01:30   17   Q.   What is the relative inertial velocity mode?

01:30   18   A.   On the aircraft, it was a mode of operation

01:30   19   that allowed our vehicle to follow another vehicle

01:30   20   using a relative velocity command.

01:31   21   Q.   Could you maybe explain a little bit how this

01:31   22   relative inertial velocity mode worked on the aircraft?

01:31   23   A.   Are you asking on the Eagle Eye --

        24   Q.   Yes.

01:31   25   A.   -- aircraft?

692

01:31   1   Q.   Yes. Yes.

01:31   2   A.   In general, we can provide a command that's a

01:31   3   relative command between the two vehicles.

01:31   4   Q.   What kind of command?

01:31   5   A.   Velocity commands.

01:31   6   Q.   So I think before our lunch break you

01:31   7   mentioned that the Eagle Eye aircraft was designed to

01:31   8   work with a reference vehicle.

01:31   9   Could you elaborate more about that point?

01:31   10   A.   There was a component of the design that would

01:32   11   allow you to control the vehicle relative to another

01:32   12   vehicle.

01:32   13   Q.   Okay. What was the component of the design?

01:33   14   A.   The Eagle Eye had a relative velocity mode.

01:33   15   Q.   What's the relationship between the UCARS and

01:33   16   the reference vehicle?

01:33   17   A.   The UCARS that we used and interfaced to at

01:33   18   the ground control station is a system that would be

01:33   19   installed shipboard.

01:33   20   Q.   Then back to the ground control station that's

01:33   21   in communication with the UCARS, what was the function

01:33   22   of the ground control station in terms of the Eagle

01:33   23   Eye -- Eagle Eye aircraft working relative to the

01:34   24   reference vehicle?

01:34   25   A.   So the ground control station communicated

693

01:34   1   with the shipboard UCARS system and transmitted

01:35   2   relevant information to the air vehicle.

01:35   3   Q.   What relevant information did it transmit to

01:35   4   the air vehicle?

01:35   5   A.   I can only recall a few, and -- but it's

01:35   6   not -- but not a complete list of information.

01:35   7   Q.   That's fine.

01:35   8   A.   So I believe we sent, like I mentioned

01:35   9   earlier, ship heading, ship track, ship position. I

01:35 10   remember those specifically, but it's been quite a

01:35 11   while.

01:35 12   Q.   Were you able to issue any specific value of

01:35 13   the relative velocity to the aircraft from the control

01:35 14   station?

01:35 15   A.   The control station allowed for sending a

01:36 16   relative velocity command to the aircraft.

01:36 17   Q.   So back to what you just said about the ground

01:36 18   control station allowing for sending a relative

01:36 19   velocity command, was that command issued to the

01:36 20   control system on board the aircraft?

01:36 21   A.   I believe so.

01:36 22   (Video ends.)

01:36 23   MR. HIGH: DJI calls by deposition

01:36 24   Mr. Robert Pascal.

01:29 25   (Video deposition of Robert Pascal played as follows.)

694

01:29   1   Q.   Would you please state your name and address

01:37   2   for the record.

01:37   3   A.   Yeah. My name is Robert Pascal. I live at

01:37   4   400 North Ridge Drive, Southlake, Texas.

01:37   5   Q.   Do you understand that your answers will be

01:37   6   under oath today?

01:37   7   A.   Yes.

01:37   8   Q.   Okay. And is there any reason that you cannot

01:37   9   provide true and -- full and truthful testimony today?

01:37   10   A.   No.

01:37   11   Q.   Okay. You became the intellectual property

01:37   12   director in 2005 of Textron Innovations, Inc., correct?

01:37   13   A.   Correct.

01:37   14   Q.   Okay. Are you still in that role today?

01:37   15   A.   Yes. I am.

01:37   16   Q.   Did Textron Innovations, Inc. conduct any

01:37   17   valuation of the five asserted patents in this

01:37   18   litigation?

01:37   19   A.   Not to my knowledge.

01:37   20   Q.   Did Textron Innovations, Inc. hire any third

01:37   21   party to conduct a valuation of the five asserted

01:37   22   patents in this litigation?

01:37   23   A.   Not to my knowledge.

01:37   24   Q.   But Textron Innovations, Inc. has tried to

01:37   25   sell patents -- its patents before, correct?

695

01:37   1   A.   There have been -- there's been offers to

01:37   2   sell.

01:37   3   Q.   Okay. And have companies expressed interest

01:37   4   in those patents that Textron Innovations, Inc. has

01:37   5   offered to sell?

01:37   6   A.   Not to my knowledge.

01:38   7   Q.   Would you consider the APT to be a drone?

01:38   8   A.   I would consider the APT to be a UAV or a

01:38   9   drone, yes, either one.

01:38   10   Q.   Okay. Is APT something that you believe will

01:38   11 compete with DJI's drone products?

01:38   12   A.   I don't know what all products DJI is involved

01:38   13 in.

01:38   14   Q.   You said you were generally familiar with

01:38   15 DJI's products from before the lawsuit, correct?

01:38   16   A.   I'm familiar with the products that are sold

01:38   17 in their -- in retail stores, commercial to retail

01:38   18 stores, yes.

01:38   19   Q.   Would you consider the anticipated APT product

01:38   20 to compete with DJI's products that are sold in

01:38   21 commercial retail stores?

01:38   22   A.   No.

01:38   23   Q.   And why do you think that the APT will not

01:38   24 compete with the DJI products that are sold in retail

01:38   25 stores?

696

01:38   1   A.   I'm not aware of any DJI products sold in

01:38   2   retail stores that are intended to be for autonomous

01:39   3   package delivery.

01:39   4   Q.   Do you consider any other Textron products to

01:39   5   compete with DJI products that are sold in retail

01:39   6   stores?

01:39   7   A.   I don't know. No, I don't believe so.

01:39   8   Q.   And you're not familiar with any other DJI

01:39   9   products?

01:39   10   A.   No.

01:39   11   Q.   Okay. It's only an offer for sale for the

01:39   12   '909 patent, correct?

01:39   13   A.   Yes.

01:39   14   Q.   Okay. And did Textron ever receive a response

01:39   15   from DJI about this offer to sell the '909 patent?

01:39   16   A.   No.

01:39   17   Q.   Okay. So DJI never expressed any interest in

01:39   18   the '909 patent in response to this offer to sell?

01:39   19   A.   Not any interest to Bell or to Textron

01:39   20   Innovations.

01:39   21   Q.   Has anyone expressed interest in purchasing

01:39   22   the '909 patent from Textron and Bell?

01:39   23   A.   Not that I'm aware of.

01:40   24   (Video ends.)

01:40   25   MR. SCHLESINGER: DJI calls Dr. Illah

697

01:40   1   Nourbakhsh.

01:40   2   (The witness was sworn.)

01:40   3   DIRECT EXAMINATION

01:40   4   BY MR. SCHLESINGER:

01:40   5   Q.   Good afternoon, Dr. Nourbakhsh.

01:41   6   A.   Good afternoon.

01:41   7   Q.   Would you please state your name for the

01:41   8   record?

01:41   9   A.   Sure. I'm Illah Nourbakhsh.

01:41 10   Q.   And would you please introduce yourself to the

01:41 11   jury?

01:41 12   A.   Sure. Pleased to meet y'all. My name is

01:41 13   Illah Nourbakhsh, and I live in Pittsburgh,

01:41 14   Pennsylvania.

01:41 15   Q.   And will you please tell the jury why you're

01:41 16   here today?

01:41 17   A.   Sure. I am here today because I was asked by

01:41 18   counsel to prepare some opinions for this proceedings

01:41 19   today.

01:41 20   Q.   And did you prepare any slides to help with

01:41 21   your presentation?

01:41 22   A.   I did.

01:41 23   MR. SCHLESINGER: Could we please put up

01:41 24   Dr. Nourbakhsh's slides?

01:41 25   Thank you.

698

01:41   1   BY MR. SCHLESINGER:

01:41   2   Q.   Do you have any degrees?

01:41   3   A.   I do have degrees.

01:41   4   Q.   And where are your degrees from?

01:41   5   A.   Well, I grew up in Platte City, Missouri,

01:41   6   which is a tiny farm town near Kansas City, Missouri.

01:41   7   And the culture shock is that I moved to the West

01:41   8   Coast, San Francisco Bay area.

01:41   9   And I got all my degrees after high school

01:41 10   from Stanford University. So I got a bachelor's there,

01:42 11   and I wouldn't leave. So I got a master's there, and I

01:42 12   still wouldn't leave. So I got my doctorate there.

01:42 13   Q.   And what type of projects did you do at

01:42 14   Stanford?

01:42 15   A.   I took on this idea of doing a lot of

01:42 16   project-based work because I was a remote-control

01:42 17   airplane nut growing up. So I liked to build these

01:42 18   airplanes and fly them. And of course you crash them a

01:42 19   lot when you fly them. So you end up building them

01:42 20   again and again.

01:42 21   So when I got to Stanford, first thing I did

01:42 22   is we built an electric race car and raced it,

01:42 23   actually, all the way across Texas. We drove it to

01:42 24   Florida. And then we drove it from Florida up to

01:42 25   Michigan, to Detroit, to the finish line at General

699

01:42 1   Motors.

01:42 2   And then later on I got into more academic

01:42 3   things. I worked on the genome project, which was that

01:42 4   project in the -- I guess I'm showing my age. This was

01:42 5   in the late 1990s when we were sequencing the human

01:42 6   body and figuring out how diseases are related to our

01:42 7   DNA.

01:42 8   And then after that project, I got involved in

01:42 9   robotics. I built a whole lot of robots that navigated

01:43 10   the campus. And I taught classes, even though I was a

01:43 11   student, to the other students at Stanford on how to

01:43 12   program robots and how to design robots.

01:43 13   Q.   And what type of work did you -- I'm sorry.

01:43 14   What experience do you have after your

01:43 15   doctorate?

01:43 16   A.   If you go to the next slide, I kind of go

01:43 17   through my work experience. You all heard

01:43 18   Mr. Christensen talking two days ago about his desire

01:43 19   to be an astronaut, and I shared that dream with him.

01:43 20   So I wanted to be an astronaut, but I had

01:43 21   these glasses so I knew I'd never qualify, because that

01:43 22   was a requirement back then.

01:43 23   And so I thought the next best thing was to

01:43 24   work on -- well, on spacecraft that are going to space

01:43 25   and exploring the world for us. So when I was

700

01:43   1   finishing my Ph.D., I went to the Jet Propulsion labs

01:43   2   over in Pasadena, California. I worked on the

01:43   3   spacecraft there called Cassini which orbited Saturn

01:43   4   and looked at Saturn's rings. And that was quite the

01:43   5   sight.

01:43   6   And after that I got a professorship at

01:44   7   Carnegie Mellon University, which is in Pittsburgh

01:44   8   where I am now. So I started my professorship, and

01:44   9   that means you basically -- you're teaching and you're

01:44   10 doing research, and you're going back and forth between

01:44   11 the two.

01:44   12   And then I've got NASA on here because you all

01:44   13 recall Spirit and Opportunity were the first rovers we

01:44   14 landed on Mars in quite a number of years, right around

01:44   15 2003. So I took a leave of absence at that point from

01:44   16 Carnegie Mellon, and I was honored to join the Civil

        17 Service.

01:44   18   And as a civil servant, then I was lead of

01:44   19 robotics for NASA Ames. So I managed a group there

01:44   20 that was helping with engine systems for those robots,

01:44   21 and stayed there awhile and then went back and resumed

01:44   22 my professorship at Carnegie Mellon, and that's where

01:44   23 I've been ever since. And I will stay there until I

01:44   24 retire.

01:44   25   Q.   And can you tell me a little bit more about

701

01:44   1   your experience at Carnegie Mellon and what you do?

01:44   2   A.   Sure. I have a slide that talks about that a

01:44   3   little bit. Thank you.

        4   So at Carnegie Mellon I have -- every

01:44   5   professor has a lab. That's not unusual. I have about

01:45   6   40 people on and off that work in the lab. They're

01:45   7   students, staff, other faculty. And it's called the

01:45   8   CREATE Lab. We also like acronyms in academia. So

01:45   9   CREATE stands for something. It means Community

01:45   10 Robotics, Education and Technology Empowerment.

01:45   11   A lot of the work we do is on thinking about

01:45   12 communities of people around the world and how robot

01:45   13 technologies can help them achieve a better life. So

01:45   14 we do a lot around air pollution, water pollution, like

01:45   15 lead in the water.

01:45   16   We do a lot of educational robots. We have

01:45   17 one that helps kindergartners and preschool kids

01:45   18 self-calm, because there's a problem with self-calming

01:45   19 in our society. So we have robots that help them smell

01:45   20 the robotic flower and lights up and helps them do

01:45   21 breathing regulation, for example.

01:45   22   And during the hurricane, Hurricane Katrina

01:45   23 that hit New Orleans, we worked with NASA using a Lear

01:45   24 jet to actually map everywhere that they can drop

01:45   25 supplies because all the normal supply drop points were

01:45 1 flooded, and it was quite a disaster.

01:45 2   And then just recently when the train derailed

01:45 3 in Ohio, we were measuring toxicities in the soil and

01:46 4 the air and helping visualize that so people can

01:46 5 understand is it safe to stay in my house or should I

01:46 6 get out of home and find a cousin somewhere a couple

01:46 7 hundred miles away?

01:46 8   So everything we do is with robotics, on

01:46 9 robotics, but takes robotics and tries to apply it to

01:46 10 some kind of societal good.

01:46 11   Q.   And what type of classes do you teach at

01:46 12 Carnegie Mellon?

01:46 13   A.   I've been there more than 27 years now so

01:46 14 every kind of class you can imagine involving robotics.

01:46 15 I've taught systems engineering, introduction to

01:46 16 artificial intelligence, computer science, programming,

01:46 17 robot programming, ethics in robotics. I think that

01:46 18 one I share with the other expert. He also taught an

01:46 19 ethics class, and numerous other classes in those

01:46 20 veins.

01:46 21   Q.   Have you authored anything?

01:46 22   A.   I have. I have some authoring on the next

01:46 23 page. Everybody you've heard from has patents. I do

01:46 24 too. I have 21 patents. So I have some experience

01:46 25 with patenting.

01:46   1   Professors have to publish. They call it

01:47   2   publish or perish. If you don't publish, they fire

01:47   3   you. So we all publish. And so I have more than a

01:47   4   couple of hundred publications in various journals and

01:47   5   magazines and articles.

01:47   6   And then I have five books that are shown

01:47   7   here. Some of them are boring and dry textbooks for

01:47   8   class, and then some of them are just for popular

01:47   9   readership. "Robot Futures" is about how is robotics

01:47   10   changing society right now, like AI and ChatGPT-4 and

        11   all that.

01:47   12   "Parenting For Technology Futures" is about

01:47   13   how do we as parents think about raising children in a

01:47   14   world where we're surrounded by AI and technology.

        15   What do we do to prepare them for that future world

01:47   16   when we don't even know what the technologies we're

01:47   17   facing are going to be like.

        18   And then I also have seven or eight other

01:47   19   books that I'm a chapter author in, like a book on Star

01:47   20   Wars that I wrote the chapter on about landing on the

01:47   21   Moon.

01:47   22   Q.   And what experience do you have related to

01:47   23   flight?

01:47   24   A.   I will slow down.

01:47   25   In terms of flight, I was always, as I said,

704

01:48   1   excited about flying. And so when I started my career

01:48   2   at Stanford, I also worked on the side and made enough

01:48   3   money to take flying lessons.

01:48   4   So I have a number of flying licenses. I'm a

01:48   5   single-engine land pilot, which means I can fly

01:48   6   high-performance aircraft that have a single propeller

01:48   7   on the front.

01:48   8   I also got my instrument rating, and that

01:48   9   allows me to fly in clouds. So I know how that whole

01:48   10 kind of instrument side of the flying system works.

01:48   11 That's how commercial airliners fly is they use

01:48   12 instrument ratings.

01:48   13   And then I also got my rotor craft helicopter

01:48   14 license, and that license allows me to fly any

01:48   15 helicopter. And I've flown -- in this picture,

01:48   16 actually, on the left, I'm showing this one here.

01:48   17 That's the Cessna 182 Skylane from 1966. I like old

01:48   18 things. That's my airplane.

01:48   19   So I worked off and paid off the debt on that,

01:48   20 and I own that now. And, in fact, two weeks ago, I

01:48   21 took my kids to New Orleans from Pittsburgh so they

01:49   22 could see the south using that.

01:49   23   The one on the right here is called an Agosta.

01:49   24 It's an Italian helicopter that's really fancy. It has

01:49   25 all kinds of autopilots and hovering and everything,

705

01:49   1   and relatively old but it has all those features.

01:49   2   That's one of many helicopters I've flown.

01:49   3   I will never be able to afford to buy one

01:49   4   because they're impossibly expensive, whereas the

01:49   5   Cessna costs about as much as a used car.

01:49   6   And then at the bottom I got a drone because I

01:49   7   also got drone certification from the FAA. So I'm

01:49   8   allowed to fly drones over populated areas to do

01:49   9   testing and such at the university.

01:49   10   Q.   Have you ever been qualified as an expert in a

01:49   11   patent case -- or patent cases related to technologies

01:49   12   like the ones we're here to talk about today?

01:49   13   A.   Yes. I've worked on cases that involve things

01:49   14   like control systems and balance.

01:49   15   MR. SCHLESINGER: Your Honor, DJI tenders

01:49   16   Dr. Nourbakhsh as an expert in robotics and control

01:49   17   systems, including the subject matter of the asserted

01:49   18   patents.

01:49   19   MR. RICH: No objection.

01:49   20   THE COURT: He'll be accepted.

01:49   21   MR. SCHLESINGER: Thank you.

01:49   22   BY MR. SCHLESINGER:

01:50   23   Q.   Dr. Nourbakhsh, what were you asked to do in

01:50   24   this case?

01:50   25   A.   I was asked -- and I have a slide to summarize

706

01:50   1   this for you. I was asked to render three kinds of

01:50   2   opinions.

01:50   3   One is: As you know, there's some specific

01:50   4   claims that Textron is asserting that DJI is infringing

01:50   5   on. You've been hearing all about those claims. So

01:50   6   for those claims, I analyzed whether or not DJI is

01:50   7   infringing on those or not.

01:50   8   The second set of things I did is: For those

01:50   9   same claims, the ones that Textron is asserting against

01:50   10   DJI, I looked at those claims to try and understand

01:50   11   whether I believed they're valid or whether they're

01:50   12   invalid.

01:50   13   And then third and last, I was asked to

01:50   14   analyze the technical value of those claims toward

01:50   15   DJI's products and also possible alternative ways that

01:50   16   DJI could have their drones function.

01:50   17   Q.   And after you analyzed those three things, did

01:51   18   you form any opinions?

01:51   19   A.   I did.

01:51   20   Q.   What is your opinion with respect to the first

01:51   21   question?

01:51   22   A.   My opinion for the first question is that

01:51   23   DJI's drones do not infringe on the claims that Textron

01:51   24   is asserting.

01:51   25   Q.   And what opinion did you reach with respect to

707

01:51   1   the second question?

01:51   2   A.   My opinion on the second question was -- after

01:51   3   looking at those same claims is that they're invalid.

01:51   4   Q.   And what about the third question?

01:51   5   A.   On the third question, I both evaluated and

01:51   6   will describe to you some alternative designs. And I

01:51   7   also reached the conclusion that there's no technical

01:51   8   value that those patents provide to DJI's drones.

01:51   9   Q.   And for the first question, you indicated that

01:51   10   your opinion is that the DJI drones do not infringe.

01:51   11   Is that with respect to both literal

01:51   12   infringement, doctrine of equivalents and indirect

01:51   13   infringement?

01:51   14   A.   That's correct.

01:51   15   Q.   Let's start with the '909 patent and the first

01:52   16   question.

01:52   17   Have you -- first off, have you been in the

01:52   18   courtroom the entire trial?

01:52   19   A.   I have been here every minute.

01:52   20   Q.   And can you briefly explain what the '909

01:52   21   patent is about?

01:52   22   A.   Sure. I have a slide that helps a little bit

01:52   23   with that. You were just hearing some great testimony

01:52   24   from some of the inventors and others about the '909

01:52   25   patent. And they kept using that phrase "relative

708

01:52   1   inertial velocity." That's what it's all about.

01:52   2   If you have a boat that's moving, it's bobbing

01:52   3   up and down in the ocean. And if you have a drone

01:52   4   that -- I'm sorry -- an aircraft that's flying in to

01:52   5   land on that boat, the '909 patent, just like they

01:52   6   talked about, is all about the relative speeds between

01:52   7   the two.

01:52   8   It's moving at 30 miles an hour, and I'm going

01:52   9   at 35 miles an hour. So it's reasoning about those

01:52   10 five miles an hour in between. How fast am I getting

01:52   11 closer to the ship?

01:53   12   And so the patent's really about how do we

01:53   13 think about controlling something and landing on

01:53   14 something that's moving so that we can do that safely

01:53   15 so that no last-minute motions cause us to crash.

01:53   16   Q.   Does the '909 patent claim to have invented

01:53   17 following another object?

01:53   18   A.   Following other objects has been around for

01:53   19 many, many years in all kinds of places. The '909

01:53   20 patent is about the idea of being able to close that

01:53   21 distance, that relative velocity, that relative speed

01:53   22 and, therefore, being able to do things like land on

01:53   23 something.

01:53   24   Q.   And does the '909 patent itself describe prior

01:53   25 inventions or prior ways of doing following?

01:53   1   A.   It does. If you go to the next slide, this is

01:53   2   a little section near the very beginning, in the middle

01:53   3   of the first column of the '909 patent.

01:53   4   It's really common for a patent to start by

01:53   5   telling you what's important, what's the problem we're

01:53   6   trying to solve? And then next, what have people done

01:53   7   before? What has already been invented and is already

01:54   8   known about?

01:54   9   And this is one of the sections where this

01:54   10   patent does that. And it's got some words about using

01:54   11   sensors and radar and vision, but one of the most

01:54   12   important things patents do is they actually reference

01:54   13   other work. They say, here's somebody who already did

01:54   14   something that's related to this, but it's already been

01:54   15   done in the past.

01:54   16   And I want to show you two examples of that --

01:54   17   the '909 patent calls out here. So if you go to the

01:54   18   next slide, please.

01:54   19   One of the patents that the '909 patent says,

01:54   20   here's something somebody has done before, and what

01:54   21   they show is this picture. Because what they're making

01:54   22   the point of here is, if you're following another car,

01:54   23   the common way that was done before is you have a radar

01:54   24   or sonar on the front of your bumper and you're

01:54   25   measuring the distance to the thing you're following.

01:54   1   So the follower is in charge of gathering all

01:54   2   the data it needs to figure out how to follow whatever

01:54   3   it's following.

01:54   4   And so this idea that the aircraft, so to

01:55   5   speak, or the back car can collect what it needs to and

01:55   6   do the right thing and follow something, that was what

01:55   7   the '909 patent is describing here. That's already

01:55   8   done.

01:55   9   The next example that the '909 patent gives is

01:55   10   also for another patent that's earlier, and it's an

01:55   11   important example actually. You know, our armed forces

01:55   12   depend greatly on this incredible range that our

01:55   13   fighter pilot jets have because of in-flight refueling.

01:55   14   They can't hold that much fuel, but you can have

01:55   15   something like a KC-135 supertanker, big airplane, and

        16   it has a nozzle coming out of the back.

01:55   17   And it sounds like science fiction, but the

01:55   18   jet can fly and then the 135 actually comes down and

01:55   19   mates the end of the fuel nozzle to the top of the jet

01:55   20   while they're both flying and can fill up its fuel tank

01:55   21   with jet fuel. It's a remarkable process.

01:55   22   This patent describes the fact that you can

01:55   23   have a camera on that nozzle so that the 135 is

01:55   24   actually measuring the position and movement of that

01:56   25   jet with that camera, with that vision system, to go in

711

01:56 1   and mate and actually refuel it.

01:56 2   And again, that's an example of something that

01:56 3   '909 patent is itself saying, we're not inventing this.

01:56 4   This was already done and here is an example.

01:56 5   Q.   And so what's -- what is that shown on the

01:56 6   picture on the left?

01:56 7   A.   Yes. In the picture here, this is the

01:56 8   refueling nozzle. It comes out of the back of a

01:56 9   KC-135. This is the F-16. I'm getting used to the

01:56 10   screen now. And then there's a camera right here. And

01:56 11   this picture here, that picture is the view out the

01:56 12   back of that camera seeing the airplane.

01:56 13   And I know you're seeing an airplane with four

01:56 14   jet engines. The reason is they did practice this on

01:56 15   other KC-135s. So it's two big airplanes, one

01:56 16   refueling the other.

01:56 17   Q.   And the quote that's up there, where is that

01:56 18   from?

01:56 19   A.   In the '909 patent, it talks about describing

01:56 20   this patent and saying this patent is talking about

01:56 21   using a camera to determine relative positions and

01:57 22   motion.

01:57 23   Q.   And what does the '909 patent describe as its

01:57 24   invention over these prior methods?

01:57 25   A.   Let's go to the next slide so we can dig into

712

01:57 1   what the '909 patent says is its contribution.

01:57 2   So of course, it wants to control the position

01:57 3   and velocity, and the thing the '909 patent keeps

01:57 4   saying is this idea of relative. You've heard that

01:57 5   this morning and yesterday, always talking in terms of

01:57 6   relative.

01:57 7   And one very important part that it points out

01:57 8   that it says is new is this idea that the controlled

01:57 9   vehicle -- controlled vehicle is the aircraft, right?

01:57 10 It's the thing that's following. It receives data

01:57 11 communicating the position and movement of the

01:57 12 reference vehicle.

01:57 13   The reference vehicle is this; it's the boat.

01:57 14 And what it's saying is novel is -- you know, those two

01:57 15 cars, the back car is measuring the distance to the

01:57 16 front car. Now, the patent is saying, we want a system

01:58 17 where, if I'm landing on the boat, I'm receiving

01:58 18 information about where the boat is and how it's moving

01:58 19 in the waves, for example.

01:58 20   That was what the '909 patent says is new.

01:58 21   Q.   It may just be my screen, but I might suggest

01:58 22 a different color if you can. The yellow's a little

01:58 23 hard to see.

01:58 24   A.   Let's try. I didn't know I could choose.

01:58 25   Is that better?

713

01:58   1   Q.   Yes.

01:58   2   A.   Okay.

01:58   3   Q.   Okay. And does the '909 patent have any

01:58   4   figures that illustrate this?

01:58   5   A.   Yes. Let's go ahead and go to the next slide.

01:58   6   I should have said all that on this slide perhaps.

01:58   7   But what we're doing here is the '909 patent

01:58   8   is saying, if we're going to land on this landing pad

01:58   9   on the boat, we really want to be able to get the best

01:58   10   information we can about the boat, where it is and how

01:58   11   it's moving and bucking in the waves so that as this

01:58   12   airplane gets closer and closer, it can do the right

01:58   13   thing.

01:58   14   And as you heard from Mr. Epp's testimony

01:58   15   today, it's not even one relative -- relative velocity

01:59   16   command because as you come in, you're going to be

01:59   17   going fast compared to the boat and then slower and

01:59   18   slower and slower, till you're moving really gradually

01:59   19   at the end so you can make -- touch down at a very slow

01:59   20   relative speed.

01:59   21   Q.   And how do you account for the waves or the --

01:59   22   of the ship?

01:59   23   A.   Well, what's important about the waves is that

01:59   24   you need to be able to understand how the boat's moving

01:59   25   in real time so that if you're coming in for landing

714

01:59   1   and a big wave is making the boat surge upwards, you

01:59   2   better slow down how fast you're going down.

01:59   3   You know, we saw the Textron video of their

01:59   4   aircraft landing vertically. If you're landing on a

01:59   5   boat and the boat starts coming up, you better arrest

01:59   6   your downward motion, otherwise you're going to have a

01:59   7   crash. It's going to hit too hard.

01:59   8   Q.   And does the '909 patent describe a system for

01:59   9   implementing this relative inertial velocity?

01:59   10   A.   Yes. It does. Let's go to the next picture.

02:00   11   This looks like a complicated picture, but I

02:00   12   promise to talk you through it. It's a figure from the

02:00   13   '909 patent itself.

02:00   14   And it's got two sides to it. So we can kind

02:00   15   of talk about them one at a time. There's the aircraft

02:00   16   side, and there's the boat side.

02:00   17   And if we just start with the aircraft, kind

02:00   18   of go bottom up, there's a control system. That's the

02:00   19   system on the aircraft actually deciding how to fly.

02:00   20   So, for instance, go and land on the boat.

02:00   21   And of course, the control system does that by

02:00   22   manipulating all these controls. It can spin up and

02:00   23   down the propellers, and it can control all the wing

02:00   24   surfaces and change their shape so that the aircraft

02:00   25   can fly through the air faster, slower, higher, lower.

715

02:00   1   The other part on the left side of this figure

02:00   2   is that you'll notice the aircraft has two kinds of

02:00   3   information it's receiving. One, GPS, global

02:00   4   positioning system. That's the same thing your

02:00   5   telephones have that you use when you are looking at a

02:01   6   map to figure out where you are.

02:01   7   It also has these sets of boxes here called

02:01   8   inertial movement sensors. Inertial movement sensors

02:01   9   is a long word, but it's a pretty simple idea. They're

02:01   10   little chips that determine how fast the airplane is

02:01   11   accelerating this way, this way, this way, and how fast

02:01   12   it's spinning this way, this way and this way.

02:01   13   So those are six degrees, and those six

02:01   14   degrees define all the ways in which something's

02:01   15   accelerating, getting pitched and rolled, like, by the

02:01   16   waves.

02:01   17   So this one is positioned information, and

02:01   18   this one is movement information. And of course, the

02:01   19   control system is going to use that to figure out how

02:01   20   to move the aircraft. That's the left side.

02:01   21   Now, if I clear that, the right side is

02:01   22   showing you what's on the boat in their system. And

02:01   23   what's on the boat in their system is two things.

02:01   24   Remember, we said what they find special is that

02:02   25   they're sending information to the aircraft so it's

716

02:02   1   receiving information about the position and the

02:02   2   movement of the boat.

02:02   3   Those are called out here. You have a GPS

02:02   4   receiver module here. That's going to give you the

02:02   5   position of the boat. And then you have inertial

02:02   6   movement sensors here, and they're going to tell you

02:02   7   how the boat is pitching and rolling.

02:02   8   And if I was building this boat, I'd put one

02:02   9   up here and one down here in the back because then you

02:02   10   get really accurate information on how the boat is

02:02   11   moving in the waves.

02:02   12   You'll notice there's multiple boxes here.

02:02   13   One, two, three boxes. That's because usually there's

02:02   14   a whole lot of chips that do this for you to figure out

02:02   15   all these motions.

02:02   16   And then you'll notice both of these, this and

02:02   17   this, they're both going up through this link through

02:02   18   the data receiver right into the control system. So

02:02   19   the control system has information about both how the

02:02   20   boat's moving and the position of the boat.

02:02   21   Q.   Now, is that how -- you just described this

02:02   22   figure. Thank you.

02:03   23   Is that consistent with how the '909 patent

02:03   24   describes this figure?

02:03   25   A.   Yes.

717

02:03 1   Q.   Now, if you have GPS information -- I believe

02:03 2 you were here earlier. As talked about, you could

02:03 3 figure out the movement data, why then have initial

02:03 4 (sic) movement sensors on the -- as well as GPS?

02:03 5   A.   Yeah. We've heard a lot in this courtroom

02:03 6 about, you know, if I drove from Fort Worth to here and

02:03 7 I take two GPS readings, I can figure out that I was

02:03 8 speeding. And Mr. Harris is right. You can figure out

02:03 9 your average speed.

02:03 10   But average speed is not movement data.

02:03 11 Average speed is on average how fast were you going for

02:03 12 that whole hour. It's -- GPS is telling you where that

02:03 13 boat is, but if you want an accurate sense of what's

02:03 14 happening to the landing surface as it pitches and

02:03 15 rolls in the waves, you want to know instantly, right

02:03 16 now, how is that landing surface moving, not just where

02:03 17 has it been for the last hour or for the last ten

02:03 18 minutes or even for the last millisecond.

02:04 19   Now, in this courtroom we heard that, you

02:04 20 know, if you take multiple positions over time, you can

02:04 21 calculate speed, and that's correct. You can take many

02:04 22 positions, string them together and do some math, and

02:04 23 that's speed, but that's just giving you speed between

02:04 24 those points. It isn't telling you how you jittered in

02:04 25 between those readings. It isn't telling you if you

718

02:04   1   swayed. It isn't telling you if you pitched up.

02:04   2   Q.   What about the case in waves? Can GPS tell

02:04   3   you if you go up and down?

02:04   4   A.   No. It can't tell you if you're going up and

02:04   5   down rapidly at all.

02:04   6   Q.   Now that we've talked about this background,

02:04   7   let's take a look at Claim 1.

02:04   8   Do you have an understanding of Claim 1?

02:04   9   A.   Yes. I do.

02:04   10   Q.   Let's start from the beginning.

02:04   11   What's Claim 1 about?

02:04   12   A.   Well, we'll kind of talk about Claim 1 in

02:05   13   pieces, if that's all right, because it is heavy. It's

02:05   14   long.

02:05   15   And so is there a next slide we can go to?

02:05   16   The first part of Claim 1, called the

02:05   17   preamble, is the very first line. It just says: A

02:05   18   system for controlling flight of an aircraft.

02:05   19   So we know this is about something that's

02:05   20   controlling the aircraft and the way it flies. That's

02:05   21   clear.

02:05   22   The first big chunk here, the sensor system

02:05   23   part, the important part here is position and movement

02:05   24   of the aircraft. And you remember we saw that on that

02:05   25   diagram I showed you. That's the aircraft being able

719

02:05   1   to measure its own position and its own ability to

02:05   2   understand how it's moving. So it can think about

02:05   3   relative velocities to the boat, for example, if it's

02:05   4   landing on the boat.

02:05   5   If we go to the next element of Claim 1, this

02:05   6   is the element that's all about the information the

02:05   7   aircraft is getting about the boat or, as they say in

02:05   8   this -- in this claim, the reference vehicle.

02:06   9   So it says very specifically here that the

02:06   10   aircraft has a receiver. So we know it has to be able

02:06   11   to receive something, and it says what it's receiving

02:06   12   is transmitted data.

02:06   13   So that tells you right away it's receiving

02:06   14   something over the airwaves. It's like a game of Clue.

02:06   15   We're trying to get more and more clues on what it's

02:06   16   saying.

02:06   17   And then it's saying that that data here,

02:06   18   what's it doing? It's communicating position, and it's

02:06   19   communicating movement. So we need some kind of data

02:06   20   that's communicating position and some kind of data

02:06   21   that's communicating movement. And both of those are

02:06   22   about the reference vehicle.

02:06   23   So in other words, the boat's position and the

02:06   24   boat's movement are being seized by the airplane.

02:06   25   That's what this whole element here is doing for us.

720

02:06   1   Q.   What about the next element?

02:06   2   A.   Let's go ahead and go to the next slide.

02:06   3   The next element sounds complicated:

02:06   4   Commanded data for a selected velocity of the aircraft

02:07   5   relative to the reference vehicle.

02:07   6   Instead of that wordy way, I'm going to just

02:07   7   say "selected relative velocity." And you heard today

02:07   8   in some of the testimony why they're talking about

02:07   9   selected relative velocity. Because they were

02:07   10   explaining the whole idea that we care about -- he

02:07   11   said, I think, the rate of closure.

02:07   12   If you're going toward a boat to land, how

02:07   13   fast are you going? We want to be able to choose how

02:07   14   fast you're going. Do we want you to approach at ten

02:07   15   miles an hour relatively speaking or five miles an hour

02:07   16   relatively speaking?

02:07   17   And so this is basically identifying for us

02:07   18   from now on what commanded data means. It means this

02:07   19   selected relative velocity.

02:07   20   And then if we go to the next element. Thank

        21   you.

02:07   22   This element kind of puts that all together.

02:07   23   The ingredients where -- that we have sensors, we're

02:07   24   getting this information from the boat, and then we

02:07   25   have this commanded thing. Now we're going to put it

721

02:07 1   all together to bake that cake, so to speak.

02:08 2   And so we have a control system. And what is

02:08 3   it doing? It's calculating a relative velocity. It's

02:08 4   going to figure out this relative velocity that we

02:08 5   should fly at.

02:08 6   But it has to use certain things. It has to

02:08 7   use sensed data. So it has to use the airplane's

02:08 8   understanding of its own position and its own movement.

02:08 9   Has to use that to fulfill this claim.

02:08 10   And it has to use the reference data here. So

02:08 11 it has to use information about the boat's position and

02:08 12 the boat's movement.

02:08 13   And then it's got a control, like control

02:08 14 devices. So it has to move the parts on the airplane.

02:08 15 And then this is how. How's it doing all this? It's

02:08 16 going to maintain a selected relative velocity, and

02:08 17 that selected relative velocity is coming from the

02:08 18 commanded data.

02:08 19   So it's putting everything together we saw

02:08 20 before into the act of actually controlling the

02:08 21 airplane but using all that information.

02:09 22   Q.   And what about the last element?

02:09 23   A.   The last element looks odd at first because it

02:09 24 says that that commanded data is preprogrammed prior to

02:09 25 flight. So before the airplane has taken off, somebody

722

02:09   1   has told the airplane what the relative velocities are

02:09   2   that they want it to have.

02:09   3   That sounds odd. Why would you do that before

02:09   4   flight? But as you heard from Mr. Epp, if you're

02:09   5   thinking about flight paths to land on the boat, it's

02:09   6   not about where the boat actually is in the ocean

02:09   7   because it's relative. It's about how quickly you want

02:09   8   to approach the boat and slow down for landing.

02:09   9   So what this claim is saying is that that

02:09   10   commanded data, that relative velocity command, that

02:09   11   needs to be in the aircraft, programmed in before

02:09   12   takeoff.

02:09   13   Q.   And could this just be fixed in source code?

02:09   14   A.   Well, that was something we heard yesterday,

02:09   15   the idea that there's commanded data that's prior to

02:10   16   flight because the programmers who made a DJI drone,

02:10   17   they programmed the drone.

02:10   18   But that doesn't work. Because you have to

02:10   19   have the ability for the engineers, the sailors on the

02:10   20   boat in this claim, to be able to command the system

02:10   21   and decide how they want to approach it.

02:10   22   The programmers who design the system couldn't

02:10   23   know ahead of time what are all the boats we're going

02:10   24   to be landing on and how do we want to approach those

02:10   25   all ahead of time.

723

02:10   1   Q.   And can you --

02:10   2   MR. RICH: Your Honor, may we approach,

02:10   3   please?

02:10   4   THE COURT: Sure.

02:10   5   (Bench conference.)

02:10   6   MR. RICH: Your Honor, this is the claim

02:10   7   construction. This is the claim construction order on

02:10   8   selected velocity, and he just said it was chosen by

02:10   9   the -- he's improperly construing the claim against the

02:10   10   Court's claim construction. He just gave the

02:10   11   construction that Your Honor rejected. He said it was

02:11   12   chosen by the operators. That's exactly what he said.

02:11   13   MR. SCHLESINGER: Subject to a Daubert

02:11   14   that Judge Gilliland denied and allowed him to explain

02:11   15   the plain and ordinary meaning of the claim. They

02:11   16   raised the same argument for the Daubert. He denied

02:11   17   it.

02:11   18   MR. RICH: DJI proposed "chosen by the

02:11   19   operator of the aircraft." The Court rejected that.

02:11   20   He just said that the guys on the boat are going to

02:11   21   choose the velocity.

02:11   22   MR. SCHLESINGER: This is the same issue

02:11   23   Judge Gilliland already addressed, Your Honor.

02:11   24   THE COURT: Yeah, but I -- if I rejected

02:11   25   the requirement that plain and ordinary meaning be

724

02:11   1   this, if I rejected this, then he shouldn't be saying

02:11   2   that's the plain and ordinary meaning of it.

02:11   3   I don't know what else to say. I mean,

02:11   4   I -- I don't specifically remember, but I can tell you,

02:11   5   generally speaking, the way I handle Markmans is if

02:11   6   someone makes a proposal, then it doesn't have to have

02:11   7   that.

02:11   8   Now, I mean, the real way of dealing with

02:12   9   this would have been not a Daubert, but would have

02:12   10   been -- well, it's having an additional Markman. I

02:12   11   mean, I've already rejected that that's the appropriate

02:12   12   construction. I rejected it.

02:12   13   So if you're having him argue that that's

02:12   14   what the plain and ordinary meaning has to be, then

02:12   15   that's not helping.

02:12   16   MR. RICH: They have multiple slides on

02:12   17   this later where they're going to argue noninfringement

02:12   18   based on that.

02:12   19   THE COURT: Yeah. This is not the plain

02:12   20   and ordinary meaning of this, or at a minimum, it

02:12   21   should have been taken up with me whether or not it

02:12   22   could be plain and ordinary meaning before he -- you

02:12   23   know, I -- I don't know what to say.

02:12   24   MR. RICH: We'd like an instruction to

02:12   25   the jury to disregard that last answer. He's talking

725

02:12   1   about their claim limitation.

02:12   2   MR. SCHLESINGER: That's going to be very

02:12   3   prejudicial. We did address this with Judge Gilliland.

02:12   4   We thought we were within exactly what Judge Gilliland

02:12   5   said we could do.

02:12   6   THE COURT: Tell me what he said you

02:12   7   thought you could do.

02:13   8   MR. SCHLESINGER: We argued this same

02:13   9   issue, and he said that we could put up evidence as to

02:13   10   what the plain and ordinary meaning was, and we weren't

02:13   11   precluded from doing this. And so we --

02:13   12   THE COURT: He said you were not

02:13   13   precluded from saying that your proposed construction

02:13   14   that was rejected was the plain and ordinary meaning?

02:13   15   Did you -- did you raise that with him?

02:13   16   MR. SCHLESINGER: That's exactly what

02:13   17   they raised in front of Judge Gilliland in all the

02:13   18   briefing, and that's the exact issue that he ruled on,

02:13   19   Your Honor.

02:13   20   MR. RICH: And we've objected to that

02:13   21   ruling, but this is exactly what Your Honor rejected.

02:13   22   MR. SCHLESINGER: And before

02:13   23   Dr. Nourbakhsh went up, they did not raise any

02:13   24   objections that that was an issue to address. We

02:13   25   thought this was resolved by Judge Gilliland's order

726

```
02:13   1    and them not raising it before he was put up on the

02:13   2    stand.

02:13   3                    MR. RICH:  Well, we can't see from their

02:13   4    slides that they're going to ask this.  I mean, that is

02:13   5    directly contrary to chosen by the operator.

02:13   6                    MR. SCHLESINGER:  This is an issue that

02:13   7    he's already addressed.

02:13   8                    Why don't I not ask him what the plain

02:13   9    and ordinary meaning is and still proceed with --

02:13   10                   MR. RICH:  That's already out there now.

02:14   11                   THE COURT:  Okay.  That's it.

02:14   12                   (Bench conference concludes.)

02:14   13                   THE COURT:  Ladies and gentlemen of the

02:14   14   jury, we're going to take a few minutes for a recess.

02:14   15   Hopefully we'll be back in five or ten minutes.

02:14   16                   (Jury exited the courtroom.)

02:15   17                   THE COURT:  Doctor, you can step down.

02:15   18                   You may be seated.

02:15   19                   So the issue is the claim term is

02:15   20   "selected velocity and/or position."  During the

02:15   21   Markman process, the defendant proposed:  A velocity

02:15   22   and/or position chosen by -- I think he meant the

02:15   23   operator, not the operate.

02:15   24                   Is that a typo, I'm assuming?

02:15   25                   MR. RICH:  That's correct, Your Honor.
```

727

02:15 1   THE COURT: Okay. Velocity and/or

02:15 2 position chosen by the operator of the aircraft. And

02:15 3 the Court rejected that and gave the plain and ordinary

02:15 4 meaning.

02:15 5   Now, the question is whether or not a

02:15 6 velocity -- whether or not a velocity and/or position

02:15 7 chosen by the operator of the aircraft is within the

02:15 8 ambit of being a plain and ordinary meaning.

02:16 9   Now, my understanding is that there was a

02:16 10 Daubert challenge by the plaintiff; is that right, to

02:16 11 the defendant?

02:16 12   MR. RICH: Correct, Your Honor.

02:16 13   THE COURT: Plaintiff challenged in the

02:16 14 form of a Daubert to the magistrate judge who ruled on

02:16 15 this and -- saying that the methodology -- I guess the

02:16 16 use of this construction was inappropriate because it

02:16 17 was different than plain and ordinary meaning.

02:16 18   And the Court -- Judge Gilliland denied

02:16 19 the Daubert which led the defendant to believe that it

02:16 20 was okay for you to proceed arguing that a velocity

02:16 21 and/or position chosen by the operator of the aircraft

02:16 22 falls within the ambit of the plain and ordinary

02:16 23 meaning.

02:16 24   So I think the only way to resolve this

02:16 25 at this point is I'll hear arguments right now on

02:17   1   why -- I'll start with the defendant, as to why you

02:17   2   believe that your proposed construction is within the

02:17   3   ambit of the plain and ordinary meaning, and then I'll

02:17   4   hear from plaintiff as to why they believe it's not.

02:17   5   And I'll just do a Markman -- I'll -- I

02:17   6   have the power to revise the Markman at any time, and

02:17   7   I'll rule on it at this time. And depending on what I

02:17   8   rule, we'll figure out whether or not he can say that.

02:17   9   So I'll hear first from defendant as to

02:17   10   why you believe that selected velocity and/or

02:17   11   position -- that your proposed construction is within

02:17   12   the plain and ordinary meaning.

02:17   13   MR. SCHLESINGER: Thank you, Your Honor.

02:17   14   THE COURT: Yes.

02:17   15   MR. SCHLESINGER: So the '909 patent, as

02:17   16   we heard from the inventor testimony, is about allowing

02:18   17   a plane -- aircraft to come in and land on a ship and

02:18   18   how to use different profiles for landing on a ship.

02:18   19   For example, the figures, they show the different

02:18   20   operator selections and that all these things can be

02:18   21   input.

02:18   22   And the idea that you have a selected

02:18   23   relative velocity, which is the commanded data here,

02:18   24   the selection itself means it has to be done. That you

02:18   25   have to be able to -- an operator has to be able to

02:18   1   input that selection, not that there's something --

02:18   2   code that can allow for the ship to land on the plane,

02:18   3   but actually the program data for the different

02:18   4   velocities, like Mr. Epp was explaining in his video,

02:18   5   that the profile would change. It would come in at

02:18   6   500 miles an hour or something and then switch to 4,

02:18   7   then to 3, and then to 2 and then to land on it.

02:18   8   That's the profile. That's what's being

02:18   9   programmed, and that's what's being selected.

02:18   10   Now, it can be done prior to flight, and

02:18   11   it can also be done during flight. That's what the

02:19   12   patent explains and that, in both instances, it needs

02:19   13   to be selected.

02:19   14   And so our position is that that selected

02:19   15   relative velocity is -- does actually require some type

02:19   16   of choice to be able to meet the selected. It's not

02:19   17   just any relative velocity. It's a selected relative

02:19   18   velocity, Your Honor.

02:19   19   THE COURT: Okay. Well, and you guys are

02:19   20   the smart technical people. As I've said before, my

02:19   21   patent ability has been described by a friend as being

02:19   22   that of a dog watching a television. So I'll do the

02:19   23   best that I can here.

02:19   24   But it seems to me, doing this on the fly

02:19   25   here, that what the defendant has done is essentially

02:19   1   reordered the claim term, selected velocity and/or

02:19   2   position, and kind of flipped it around and swapped out

02:20   3   the word "selected" with the word "chosen."

02:20   4   And so to me -- and you can both tell me

02:20   5   I'm wrong or either of you can tell me I'm wrong, but

02:20   6   to me the question here is whether or not the

02:20   7   substitution of the word "chosen" is different than the

02:20   8   plain and ordinary meaning of "selected."

02:20   9   That's the way I see this.

02:20   10   Is that the way the plaintiff sees it?

02:20   11   MR. RICH: No, Your Honor.

02:20   12   THE COURT: Okay. Why don't you tell me

02:20   13   what your concern is, and then I'll let the defendant

02:20   14   tell me what the problem is.

02:20   15   MR. RICH: Yes, Your Honor.

02:20   16   It's actually the same concern we already

02:20   17   resolved at Markman, and they're trying to add in the

02:20   18   words that it has to be by the operator.

02:20   19   And what they're going to do is take that

02:20   20   and say that the velocity has to be chosen by the

02:20   21   operator and then argue that the Follow Me mode is

02:20   22   preprogrammed, not the operator.

02:20   23   THE COURT: I got it. I got it.

02:21   24   So y'all have no problem with it -- the

02:21   25   inventor could have used the word "chosen" and there

02:21 1 wouldn't have been a problem. I mean, that's not the

02:21 2 problem here. He could have used selected or chosen.

02:21 3   Your problem is their addition of saying

02:21 4 "by the operator of the aircraft." And I'm pretty

02:21 5 sure, but I can't promise you, that that's the same

02:21 6 argument you made at the Markman hearing to me that --

02:21 7 where I thought the addition of the "by the operator of

02:21 8 the aircraft" was too limiting and was not required

02:21 9 within the ambit of the plain and ordinary meaning of

02:21 10 selective velocity or position, because it didn't

02:21 11 require that.

02:21 12   That's what you argued. And I'm not sure

02:21 13 if I said that on the record, but I'm pretty sure that

02:21 14 was my logic.

02:21 15   Is that what you recall?

02:21 16   MR. RICH: That's exactly right,

02:21 17 Your Honor. There's multiple preprogrammed ways of

02:21 18 doing this in the patent. That was squarely resolved

02:21 19 at Markman.

02:21 20   THE COURT: Okay. Let me hear from the

02:22 21 defendant as to why I ought to include chosen by the

02:22 22 operator of the aircraft within the plain and ordinary

02:22 23 meaning of selected velocity and/or position.

02:22 24   MR. SCHLESINGER: Your Honor, we

02:22 25 actually -- if you recall Dr. Nourbakhsh's testimony,

732

02:22   1   he wasn't saying by the operator. He was just saying

02:22   2   there has to be some type of selection by somebody.

02:22   3   By the operator is not critical. It's

02:22   4   just the fact that we think that a selection itself

02:22   5   needs to be done. Whether that word's "selection" or

02:22   6   "chosen," there still needs to be a selection.

02:22   7   THE COURT: Made by someone or -- and the

02:22   8   plaintiff's argument is it could be preprogrammed, and

02:22   9   so there doesn't -- I'm just trying to find out.

02:22   10   MR. SCHLESINGER: Yeah. If I could, they

02:22   11   basically say because our products have a fixed ability

02:22   12   to follow an object, it's hard coded. That you -- that

02:22   13   that itself is selection.

02:22   14   And what our products work is they -- it

02:22   15   actually follows based on position, and you select

02:22   16   that -- the user selects it. And the reason they don't

02:22   17   like that is because it's -- one, it's not velocity,

02:22   18   and then, two, it's after it's in flight, which is

02:22   19   exactly what the claim doesn't require.

02:23   20   And that's the opinion Dr. Nourbakhsh is

02:23   21   going to give.

02:23   22   THE COURT: A response?

02:23   23   MR. RICH: Your Honor, these words are

02:23   24   very clear in this claim, and it just says selected

02:23   25   velocity. It doesn't matter who has to select it --

733

02:23   1   THE COURT: Or if it was preselected.

02:23   2   MR. RICH: Or if it was -- as long as

02:23   3   there's an algorithm in there that calculates the

02:23   4   velocity, that's our --

02:23   5   THE COURT: Could you put up the -- could

02:23   6   one of you put up the claim so I could see this within

02:23   7   the context?

02:23   8   Okay.

02:23   9   MR. RICH: Does Your Honor see the claim?

02:23 10   THE COURT: Uh-huh. And just give me one

02:23 11   second.

02:23 12   MR. RICH: Okay.

02:23 13   THE COURT: And this is only used once,

02:23 14   right? Between 45 and 50?

02:24 15   MR. RICH: Well, commanded data is

02:24 16   referenced later in the claim where it says it's

02:24 17   preprogrammed.

02:24 18   THE COURT: Okay.

02:24 19   MR. RICH: At the very bottom of the

02:24 20   claim, Your Honor.

02:24 21   THE COURT: And is -- and is and/or

02:24 22   position, where does that come from in the proposed

02:24 23   claim term?

02:24 24   All I see is: It maintains a selected

02:24 25   velocity relative to the reference.

734

02:24   1   MR. RICH: That comes from a separate

02:24   2   claim where they were trying to construe them all at

02:24   3   once.

02:24   4   THE COURT: Okay.

02:25   5   MR. SCHLESINGER: If I may, Your Honor.

02:25   6   THE COURT: Sure. Please.

02:25   7   MR. RICH: Well, yeah. I was going to

02:25   8   direct Your Honor to some specification support, if

02:25   9   you'd like it.

02:25   10   THE COURT: Let me hear from him real

02:25   11   quick, and then you're welcome to show me the spec.

02:25   12   MR. SCHLESINGER: If we could pull up

02:25   13   Column 4, around Line 32?

02:25   14   THE COURT: Okay.

02:25   15   MR. SCHLESINGER: And in particular,

02:25   16   Lines 36 through 39.

02:25   17   It talks about the selected position

02:25   18   and/or velocity is transmitted. Again, this is -- some

02:25   19   type of selection is happening here, Your Honor.

02:25   20   And the issue is going to be whether a

02:25   21   preprogrammed algorithm that maintains a later selected

02:25   22   position meets whether there's the claim requirement

02:26   23   for a selected velocity.

02:26   24   There's no velocity in our products.

02:26   25   There's no selected velocity, preprogrammed or not.

735

02:26   1   THE COURT: Okay. Yes, sir.

02:26   2   MR. RICH: Yes, Your Honor.

02:26   3   That's referring to a particular

02:26   4   embodiment where it's not preprogrammed into the

02:26   5   system. The claim that we're looking at is

02:26   6   preprogrammed into the system.

02:26   7   And if I could point Your Honor to --

02:26   8   which I believe we pointed Your Honor to during claim

02:26   9   construction at Column 5, Lines 50 through 55, the

02:26 10   patent says that: There may be semiautomated actions

02:26 11   or shortcuts that are programmed into the system.

02:26 12   So that's like hitting a button and then

02:26 13   it just happens for you, and that's exactly what their

02:26 14   product does.

02:26 15   And then later on in the patent, it talks

02:26 16   about many advantages of autonomous and semiautonomous

02:26 17   modes. This is about autonomy and not something that a

02:27 18   user has to do.

02:27 19   And the inventors testified that this was

02:27 20   one way to do it. You didn't have to have an operator.

02:27 21   That was Mr. Harris.

02:27 22   THE COURT: Yes, sir.

02:27 23   MR. SCHLESINGER: Yeah. If you actually

02:27 24   look at that, what that is talking about being --

02:27 25   THE COURT: By "that"?

02:27 1   MR. SCHLESINGER: Sorry. The Column 5

02:27 2   reference --

02:27 3   THE COURT: Yes, sir.

02:27 4   MR. SCHLESINGER: -- on Line 50, what

02:27 5   that's talking about.

02:27 6   It then goes on to explain that the

02:27 7   operator then selects -- makes that selection. It's a

02:27 8   shortcut. So there's still a selection being done in

02:27 9   that example.

02:27 10   And it's again -- and we're not critical

02:27 11 with by the operator, but there still has to be

02:27 12 selection. But that, again, does talk about the

02:27 13 operator making that selection.

02:27 14   MR. RICH: And, Your Honor, there's a

02:27 15 "for example" in the sentence that counsel pointed to.

02:27 16   MR. SCHLESINGER: This is the cite that

02:27 17 they referred to, Your Honor.

02:27 18   THE COURT: I understand. Okay.

02:27 19 Anything else?

02:27 20   MR. RICH: No, Your Honor. Just that

02:28 21 we've already addressed it.

02:28 22   THE COURT: Anything else?

02:28 23   MR. SCHLESINGER: Not for this one,

02:28 24 Your Honor.

02:28 25   THE COURT: Okay. I'm going to take a

02:28   1   very short recess. I'll be back in just a couple

02:28   2   minutes.

02:28   3   THE BAILIFF: All rise.

02:28   4   (Recess taken.)

02:33   5   THE COURT: Thank you. You may be

02:33   6   seated.

02:33   7   So the Court has conducted what, in my

02:34   8   opinion, is essentially an additional Markman hearing.

02:34   9   I understand why the defendant -- I'm sorry -- I

02:34   10   understand that the plaintiff filed a Daubert and that

02:34   11   the magistrate judge denied the Daubert on this issue.

02:34   12   But I -- the way I see it, and there's no

02:34   13   way for maybe other people to know how I would see it,

02:34   14   but is when there's a fight like this where a party --

02:34   15   an expert has taken the position and says there's

02:34   16   infringement because of this construction or no

02:34   17   infringement because of this construction and there's a

02:34   18   fight over whether or not the construction the expert

02:34   19   used, I always of think that as being a motion for

02:35   20   summary judgment because it's -- as a matter of law,

02:35   21   it's wrong.

02:35   22   But having said all that, we are where

02:35   23   we're at right now. I feel certain that in this case

02:35   24   when I made the determination that "selected velocity

02:35   25   and/or position" was plain and ordinary meaning and

738

02:35   1   rejected the defendants' proposed construction, I feel

02:35   2   certain that my decision was based on the fact that I

02:35   3   did not believe that the plain and ordinary meaning

02:35   4   required or provided for the addition of "chosen by the

02:35   5   operator of the aircraft."

02:35   6   So my construction of this -- I think the

02:35   7   result of that is that the defendant may not have their

02:35   8   expert argue that there's no infringement because the

02:35   9   product does not comply with a construction that

02:36   10   requires that "velocity and/or position be chosen by

02:36   11   operator of the aircraft."

02:36   12   So I'm -- I find that the construction

02:36   13   that is in front of me is not the correct plain and

02:36   14   ordinary meaning, and it would be inappropriate for the

02:36   15   expert to argue that to the jury.

02:36   16   So that being said, do you -- does the

02:36   17   defendant need to do anything with your expert to --

02:36   18   he's here. He's -- and he's heard what I've said.

02:36   19   Do you need to do anything to -- because

02:36   20   of that adjustment?

02:36   21   I don't want to prejudice you. I

02:36   22   think -- I think you are absolutely -- it was fair for

02:36   23   you to assume, based on what happened with the Daubert

02:36   24   motion, that the testimony was -- would -- could go

02:36   25   forward. And so is there anything you need to do to

02:36   1   prepare your expert now before we move forward?

02:36   2   MR. SCHLESINGER: Can I ask for a

02:36   3   clarification, Your Honor?

02:36   4   THE COURT: You can.

02:36   5   MR. SCHLESINGER: I understand that we

02:37   6   cannot say anything about "selected by an operator,"

02:37   7   but are we still within bounds to talk about whether or

02:37   8   not there's been a selection at all?

02:37   9   THE COURT: Well, I can't give -- you

02:37   10   know, I can't give that kind of -- you'll just have to

02:37   11   do what you do. It says "selected velocity." So I

02:37   12   don't see any way I could tell you, you can't talk

02:37   13   about selection at all. That doesn't make sense to me.

02:37   14   But I don't know -- clearly there was

02:37   15   play in the joints there, I'm sure, over what you'd

02:37   16   like him to say about selection and what the plaintiff

02:37   17   thinks would be appropriate. So all I can do is -- you

02:37   18   ask your questions, and if they want to object, we'll

02:37   19   have to go that way.

02:37   20   MR. SCHLESINGER: And I could use some

02:37   21   time to tweak the slides a little.

02:37   22   And then also if you would indulge us, I

02:37   23   think there's another term that they would likely

02:37   24   object on. It's been in our slides so I'm not sure we

02:37   25   haven't -- why we haven't seen an objection yet. But

—740—

02:37   1   there was another term argued that, again, we thought

02:37   2   was resolved with Judge Gilliland that I'd like to

02:38   3   address.

02:38   4   THE COURT: Sure. Let's do it now.

02:38   5   MR. SCHLESINGER: May I approach?

02:38   6   THE COURT: Sure. Of course.

02:38   7   MR. SCHLESINGER: So this term concerns

02:38   8   the '752 patent. During Markman, we asked to construe

02:38   9   the broader phrase, but what we're focused in now on is

02:38   10   the term "forward speed hold."

02:38   11   THE COURT: Okay.

02:38   12   MR. SCHLESINGER: If we could pull up the

02:38   13   '752 patent. And this is Claim 13. It's around

02:38   14   Line 33, the forward speed hold loop.

02:38   15   THE COURT: Okay.

02:38   16   MR. SCHLESINGER: And just for context,

02:38   17   Your Honor, plaintiff's expert has put in evidence in

02:38   18   the record that basically just anything setting a speed

02:38   19   is sufficient, just any speed control, and we believe

02:38   20   the patent's clear as well as testimony.

02:38   21   We have testimony from Mr. Christensen

02:39   22   that I'd like to show Your Honor about what that means

02:39   23   for forward speed hold and what he is referring to.

02:39   24   After that I can point to the patent to talk about it

02:39   25   and explain.

741

02:39   1   And just for context, Your Honor,

02:39   2   Mr. Christensen was deposed after Your Honor's claim

02:39   3   construction ruling. So this is additional new

02:39   4   evidence. And what we're seeing here on Lines 4

02:39   5   through 7 is Mr. Christensen admitting that when the

02:39   6   forward speed hold loop engages, it will maintain the

02:39   7   aircraft's current forward velocity. And what we're

02:39   8   talking about is both -- the term "forward speed hold

02:39   9   loop."

02:39   10   And then if we can go back to the claim.

02:40   11   And I'd like to highlight the entire

02:40   12   longitudinal loop design limitation -- or I'm sorry --

02:40   13   if you could blow that up, not highlight it.

02:40   14   And if you could highlight "a forward

02:40   15   speed hold loop" and the second wherein clause, please.

02:40   16   And so what this claim limitation is

02:40   17   describing is --

02:40   18   And leave the highlights as you have

02:40   19   them.

02:40   20   But the first wherein clause talks about

02:40   21   when the forward speed hold loop -- oh, I'm sorry. I

02:40   22   told you to highlight the -- we'll stick with this --

02:40   23   is when the stick is out of detent, meaning it's out of

02:40   24   the center position, it will command -- it'll basically

02:40   25   do either an attitude or a rate command, and then when

742

02:40   1   you let it go, what does it do.

02:40   2   And so what this claim requires is that

02:40   3   the forward speed hold loop automatically engages. So

02:41   4   automatic engagement when it's returned to both the

02:41   5   detent and if the speed's outside of a first

02:41   6   groundspeed threshold.

02:41   7   And that's what Mr. Christensen was

02:41   8   talking about. And this is going to be in reference to

02:41   9   Figure 1.

02:41   10   If we can go there?

02:41   11   What this is referring to is the circle

02:41   12   here is the groundspeed threshold because the patent

02:41   13   talks about the forward speed hold loop is outside of

02:41   14   the AHH, which is the automatic hover hold region. And

02:41   15   you can see the arrows here going forward.

02:41   16   And what this is describing is when

02:41   17   you're outside of this region, you let go, it just goes

02:41   18   forward, maintains the current speed.

02:41   19   If you're inside the automatic hover hold

02:41   20   region and you let go, it hovers. It slows down and

02:41   21   hovers.

02:41   22   There's other things that can bring you

02:41   23   to a hover from outside that region. It's called a

02:41   24   high-speed transition hover. It's not called a forward

02:42   25   speed hold loop.

743

02:42 1   And so, you know, when talking about in

02:42 2   Column 5, Lines 21 through 30, in the first part of

02:42 3   that, about automatically engaging when the

02:42 4   controller's returned to detent position and the

02:42 5   groundspeed is outside the AHH region, which is that

02:42 6   circle we were talking about, the forward speed hold

02:42 7   loop will automatically engage.

02:42 8   And Mr. Christensen admitted that means

02:42 9   maintaining the current forward speed.

02:42 10   THE COURT: And so what is it you're --

02:42 11 what is it you want me to do?

02:42 12   MR. SCHLESINGER: So, again, what

02:42 13 Dr. Nourbakhsh is going to testify about is that -- is

02:42 14 basically this. That the -- what the patent is

02:42 15 describing for a forward speed hold loop, when it's

02:42 16 automatically engaged in detent, it means holding the

02:42 17 speed, not decelerating to zero. And we think that's

02:42 18 the plain and ordinary meaning.

02:43 19   THE COURT: And decelerating to zero and

02:43 20 hovering?

02:43 21   MR. SCHLESINGER: Right. Not

02:43 22 decelerating to zero and hovering, Your Honor.

02:43 23   THE COURT: Okay.

02:43 24   Yes, sir.

02:43 25   And help me out. Was this a claim term

744

02:43   1   that we took up?

02:43   2   MR. RICH: Your Honor, may I approach

02:43   3   with the claim construction order from Your Honor?

02:43   4   THE COURT: Sure.

02:43   5   MR. RICH: I highlighted it for you.

02:43   6   Your Honor, as you can see, this dispute,

02:43   7   again, was squarely before the Court at the Markman

02:43   8   hearing where DJI tried to get the Court to construe

02:43   9   the claim to be limited to maintaining "current forward

02:43   10 speed." Current forward speed.

02:43   11   And I'll read Your Honor how they framed

02:43   12 the brief from -- framed the dispute at that point in

02:43   13 time. This is their claim construction brief:

02:43   14   The parties dispute whether the forward

02:43   15 speed hold results in the aircraft maintaining its

02:43   16 current forward speed as proposed by DJI or whether it

02:44   17 results in the aircraft slowing down to a stop and

02:44   18 hovering when the controller is returned to a detent,

02:44   19 as Textron contends.

02:44   20   That was resolved against DJI already,

02:44   21 and we had all the support in our claim construction

02:44   22 brief.

02:44   23   THE COURT: And so to make sure I

02:44   24 understand, the defendant would like -- and if I get

02:44   25 this wrong, someone holler.

745

02:44   1   What the defendant would like to say is

02:44   2   that he would -- they would like to have their expert

02:44   3   say that when we're talking about forward speed loop,

02:44   4   that it will -- it will maintain the current forward

02:44   5   speed, and theirs -- and their product doesn't do this

02:44   6   so it doesn't infringe.

02:44   7   That's what -- and your argument is --

02:44   8   the plaintiff's argument is that at the time they

02:44   9   proposed -- at the time I dealt with the Markman, the

02:45   10   construction of "forward speed hold loop," the

02:45   11   requirement that it maintain the current forward speed

02:45   12   was discussed at the -- was discussed in the briefing

02:45   13   and probably at the hearing as well. And the Court

02:45   14   rejected the requirement that it have to maintain the

02:45   15   current forward speed and gave plain and ordinary

02:45   16   meaning.

02:45   17   MR. SCHLESINGER: May I clarify

02:45   18   defendants' position, Your Honor?

02:45   19   THE COURT: Sure.

02:45   20   MR. SCHLESINGER: "Current" is not

02:45   21   important. What we're trying to distinguish between is

02:45   22   maintaining a speed, not decelerating to zero.

02:45   23   And I will just add, there's just no

02:45   24   description support for saying that forward speed hold

02:45   25   doesn't maintain a speed, instead is a deceleration or,

746

02:45 1 you know, decrease to hover.

02:45 2   THE COURT: Okay.

02:45 3   MR. RICH: That's incorrect. I can point

02:45 4 Your Honor to support in the specification, if we need

02:45 5 it.

02:45 6   THE COURT: Why don't you do that?

02:45 7   MR. RICH: Okay. Your Honor, there's a

02:45 8 mode --

02:45 9   THE COURT: Just to protect your record.

02:45 10   MR. RICH: Your Honor, there's a mode

02:45 11 called high-speed transition to hold in Column 9 of the

02:46 12 patent -- in the '752 patent, that is.

02:46 13   And in Column 9 at Lines 35 through

02:46 14 Column 10, roughly around Line 8, what this mode does

02:46 15 is that the aircraft will decelerate and then hold at

02:46 16 its position.

02:46 17   And that's what this whole mode is about.

02:46 18 And the inventor, Kevin Christensen, testified that

02:46 19 that's part of his invention.

02:46 20   THE COURT: A response?

02:46 21   MR. SCHLESINGER: Yes, Your Honor.

02:46 22   If you actually look at Claim 19, that

02:46 23 claim is about the high-speed transition to hover. And

02:46 24 the high-speed transition to hover, it actually talks

02:46 25 about it will not engage if it's in forward speed hold

747

02:46 1   loop, and instead it will re-engage the forward speed

02:46 2   hold loop.

02:46 3   We'll pull that up and show Your Honor.

02:46 4   THE COURT: It's up.

02:46 5   MR. RICH: I'll add that Claim 13 is the

02:46 6   way you carry out all the different modes in the

02:47 7   patent. The point about Claim 19 or 18 is not the

02:47 8   right point.

02:47 9   MR. SCHLESINGER: It says on Line 57:

02:47 10   The high-speed transition to hover will not take place

02:47 11   since speed hold will be re-engaged.

02:47 12   That's talking about speed hold, forward

02:47 13   speed hold. It's not slowing down, Your Honor.

02:47 14   So what they cited to is directly

02:47 15   contradictory to their -- to what they're saying the

02:47 16   plain and ordinary meaning is -- I'm sorry -- what the

02:47 17   spec describes.

02:47 18   MR. RICH: In Column 5, Your Honor,

02:47 19   Lines 33 through 35. Your Honor, the patent says: The

02:47 20   forward speed hold, FSH, function will be able to

02:47 21   stabilize more quickly at any groundspeed by

02:47 22   initializing to the approximate pitch attitude required

02:48 23   to hold that speed.

02:48 24   It can be any groundspeed. And

02:48 25   Mr. Christensen testified that you target your speed

748

02:48   1   and then you close on that speed, and it can be zero.

02:48   2   MR. SCHLESINGER: And, Your Honor, what

02:48   3   the claim talks about is engaging when you're at a

02:48   4   certain speed. And what this claim -- this language

02:48   5   right here's talking about is initializing to hold that

02:48   6   speed. When it says "that speed," it's referring to

02:48   7   the speed at which you engage.

02:48   8   And that's exactly what Mr. Christensen

02:48   9   testified -- I showed Your Honor -- is when it engages,

02:48   10 it's holding that current speed. That's what this is

02:48   11 saying.

02:48   12   MR. RICH: And I think he said earlier

02:48   13 that they're not trying to inject the words "current

02:48   14 speed," but I just heard it again. And this was the

02:48   15 dispute at Markman that was resolved against DJI,

02:48   16 Your Honor.

02:48   17   MR. SCHLESINGER: Your Honor, they're

02:48   18 trying to read out the word "hold."

02:48   19   THE COURT: They're trying to read out

02:48   20 the word --

02:48   21   MR. SCHLESINGER: Speed hold.

02:48   22   THE COURT: The current -- what I hear

02:48   23 them trying to read out is maintaining the current

02:48   24 speed.

02:48   25   MR. RICH: They're trying to read in

749

02:48   1   maintaining the current speed --

02:48   2   THE COURT: No. I'm saying you're trying

02:48   3   to keep them from being able to do that.

         4   MR. SCHLESINGER: And again, Your

02:48   5   Honor --

02:48   6   MR. RICH: We'd like to read, Your Honor,

02:48   7   the claims as they come, and they hold zero.

02:49   8   MR. SCHLESINGER: The claim actually

02:49   9   talks about maintaining a speed, Your Honor. It's

02:49   10   holding a speed, and that is not decelerating to zero.

02:49   11   That's what -- that's what automatic hover hold is.

02:49   12   That was what the parties agreed that term meant, not

02:49   13   forward speed hold.

02:49   14   THE COURT: Anything else?

02:49   15   MR. RICH: Other than they said what the

02:49   16   dispute was at Markman and it's been resolved.

02:49   17   THE COURT: Anything else?

02:49   18   MR. SCHLESINGER: No. Mr. Christensen

02:49   19   wasn't deposed by then.

02:49   20   Thank you, Your Honor.

02:49   21   MR. RICH: He testified on the stand,

02:49   22   Your Honor, about what it means. And we have his

02:49   23   testimony, if we need to see it.

02:49   24   THE COURT: Anything else?

02:49   25   MR. SCHLESINGER: No, Your Honor.

750

02:49 1   THE COURT: Okay.

02:52 2   (Off-the-record bench conference.)

02:54 3   MR. RICH: Your Honor, do we need to

02:54 4 identify Mr. Christensen's testimony or Dr. Michalson's

02:54 5 for the record?

02:54 6   THE COURT: No. I mean, you're welcome

02:54 7 to. If you want to do it for the record, you're

02:54 8 welcome to. If you're asking do I need it, I don't.

02:54 9 But if you want to protect your record to add it,

02:54 10 that's fine.

02:54 11   Okay. The Court is again going to find

02:54 12 that -- I just feel like this was briefed at the

02:54 13 Markman. I'm sure it was argued at the Markman and --

02:54 14 that when I said "plain and ordinary meaning," it

02:55 15 was -- it was a rejection that -- for forward speed

02:55 16 loop. That it had to maintain the current speed as was

02:55 17 proposed by the defendant.

02:55 18   So that, too, I'm not going to allow your

02:55 19 expert to testify about that either. The language that

02:55 20 you have in your proposal I don't think is the correct

02:55 21 construction of the term.

02:55 22   Do you need time to get with your expert

02:55 23 and slides?

02:55 24   MR. SCHLESINGER: Yes, Your Honor.

02:55 25   We had them prepared two days ago and

751

02:55 1   exchanged and didn't get any objections. We took a lot

02:55 2   of time. If you would indulge us for that, we'd

02:55 3   appreciate it.

02:55 4   THE COURT: No. No. I understand. How

02:55 5   much time do you need?

02:55 6   MR. SCHLESINGER: I know Your Honor's

02:55 7   ending at 4:30. I don't know how -- if it makes sense

02:55 8   to go back on the record at 4:00, a little after 4:00,

02:55 9   or if it makes sense to just resume after your hearing.

02:55 10   THE COURT: Yes, sir.

02:55 11   MR. MEEK: We could do the charge

02:55 12   conference while they're doing that.

02:55 13   THE COURT: We could do that. We could

02:56 14   do that. Yeah. Let's do that.

       15   MR. MEEK: Parallel.

02:56 16   THE COURT: Say again?

02:56 17   MR. MEEK: Parallel.

02:56 18   THE COURT: So we can go off the record.

02:56 19   (Off-the-record discussion.)

04:04 20   (Recess taken.)

04:11 21   (Hearing begins.)

04:11 22   THE BAILIFF: All rise.

04:11 23   THE COURT: Please remain standing for

04:11 24   the jury.

04:11 25   (Jury entered the courtroom.)

752

04:11   1   THE COURT: Thank you. You may be

04:11   2   seated.

04:11   3   Counsel?

04:11   4   MR. SCHLESINGER: Thank you, Your Honor.

04:11   5   BY MR. SCHLESINGER:

04:11   6   Q.   All right. Dr. Nourbakhsh, when we were

04:11   7   talking before, before we broke, we were looking

04:11   8   through Claim 1 of the '909 patent.

04:11   9   We have an updated slide with the -- a new

04:11   10   slide with the summary here.

04:11   11   Could you please explain an overview of what

04:11   12   you were explaining earlier?

04:12   13   A.   Certainly. The claims that we were talking

04:12   14   about, this sort of graphically shows some of the

04:12   15   elements that I was talking about.

04:12   16   We have at the very top here "commanded data

04:12   17   representing a selected relative velocity." That's a

04:12   18   requirement for the claim.

04:12   19   And then we have the idea that the aircraft,

04:12   20   this one here, is receiving -- you'll recall we talked

04:12   21   about -- this position and movement data about the

04:12   22   reference vehicle, which in this picture is a ship.

04:12   23   And then we have the idea that the aircraft is

04:12   24   controlling a selected relative velocity, just deciding

04:12   25   what to do and setting those.

753

04:12   1   And then we had that very last element in the

04:12   2   claim, which was that the commanded data, which is

04:12   3   selected relative velocity, needs to be preprogrammed

04:12   4   prior to flight.

04:12   5   And that's why I have the aircraft sitting on

04:12   6   an island here before it's flown to the boat.

04:12   7   Q.   And what is required for Textron to prove

04:12   8   infringement?

04:13   9   A.   Textron needs to show that, when you read that

04:13 10   claim, every single element, all the lines, all the

04:13 11   little paragraphs in the claim, all of those are

04:13 12   practiced, every one of them, by, in this case, a DJI

04:13 13   drone.

04:13 14   Q.   And what does it mean if even a single one of

04:13 15   these elements is missing?

04:13 16   A.   Then the claim is not infringed by that

04:13 17   machine.

04:13 18   Q.   Do you know what DJI products Textron accuses

04:13 19   of infringing?

04:13 20   A.   I do. I have a picture of some of them on the

04:13 21   next slide.

04:13 22   I'll slow down. Sorry.

04:13 23   These are two examples of drones that DJI

04:13 24   makes. You've heard a lot about these in the case

04:13 25   already. I've probably flown at least seven or eight

754

04:13   1   versions of these by now in preparing for this case.

04:13   2   I also own one of the ones on the left, the

04:13   3   white one called a Phantom, because many years ago I

04:13   4   used it and taught biologists how to use it in South

04:13   5   Africa to count seals on islands off the coast of

04:13   6   Africa so they can keep track of how the seal

04:14   7   populations are doing over time.

04:14   8   MR. SCHLESINGER: Your Honor, may I

04:14   9   approach?

04:14   10   THE COURT: Please.

         11   THE WITNESS: Your Honor, can I put this

04:14   12   up here?

         13   THE COURT: Of course.

04:14   14   THE WITNESS: Thank you.

04:14   15   BY MR. SCHLESINGER:

04:14   16   Q.   And I've handed you Defendants' Exhibit 746,

04:14   17   which is the Mavic Air 2.

04:14   18   Do you see that one?

04:14   19   A.   I do.

04:14   20   Q.   Have you flown this drone?

04:14   21   A.   I have.

04:14   22   Q.   And I also handed you the DJI Mini 3 Pro,

04:14   23   which is Defendants' Exhibit 988.

04:14   24   Have you flown that drone?

04:14   25   A.   I have.

755

04:14 1   Q.   And are these drones accused products in this

04:14 2   case?

04:14 3   A.   Yes. They are.

04:14 4   Q.   And did your flying of these drones inform

04:14 5   your opinions in this case?

04:14 6   A.   Yes.

04:14 7   MR. SCHLESINGER: And defendants move to

04:14 8   admit Defendants' Exhibit 988, the DJI Mini 3 Pro.

04:15 9   MR. RICH: No objection.

04:15 10   MR. SCHLESINGER: DJI moves to admit

04:15 11 Defendants' Exhibit 988, the DJI Mini 3 Pro.

04:15 12   THE COURT: Admitted.

04:15 13   MR. SCHLESINGER: Thank you, Your Honor.

04:15 14 BY MR. SCHLESINGER:

04:15 15   Q.   What features of these drones does Textron

04:15 16 accuse of infringing?

04:15 17   A.   I believe I have a slide to talk about that.

04:15 18   You heard these two words before in this case.

04:15 19 These are the specific functions, the way of using

04:15 20 these drones, that Textron is accusing of infringing.

04:15 21 One is called Follow Me, and the other one is called

04:15 22 ActiveTrack.

04:15 23   Q.   Let's start with Follow Me.

04:15 24   Can you describe how Follow Me works and what

04:15 25 it is?

756

04:15   1   A.   Certainly. I have a screenshot here. It's

04:15   2   actually a picture of the way DJI describes Follow Me.

04:15   3   The idea behind Follow Me is that as you're moving

04:16   4   about, maybe you're taking a hike or skiing down a

04:16   5   mountain -- although, in this weather, I would take a

04:16   6   hike over skiing down the mountain -- the drone follows

04:16   7   you at a fixed position, and it can essentially

04:16   8   videotape you and be your own camera person. So it

04:16   9   creates a really nice video of what you're doing as you

04:16   10 move.

04:16   11   Q.   And have you tested the Follow Me feature?

04:16   12   A.   I have.

04:16   13   Q.   Can you explain how to start Follow Me?

04:16   14   A.   Sure. Let's go to the next slide, please.

04:16   15   I want to walk you through what it means to

04:16   16 get Follow Me to start running.

04:16   17   So first I drive to the river, in this case,

04:16   18 and take it out of the box, unfold the little wings

04:16   19 here so all the propellers are facing up. Then I turn

04:16   20 it on, and I turn the controller on. Then I take off,

04:16   21 because none of this works until I take off.

04:16   22   I take off, and what I want to do is fly the

04:16   23 drone up to a place where I like the view it has of me.

04:16   24 So depending on what activity I'm doing, I might want

04:17   25 it to be 25-feet away from me, 50 feet in the air,

757

04:17   1   angle the camera so it's looking at me just so.

04:17   2   And once I like where the drone is positioned

04:17   3   in the sky, then I can bring up on the controller

04:17   4   here -- I have my phone connected to it up here, and so

04:17   5   on that phone I'm running an app. And on that app, I

04:17   6   can see myself in that camera, which is admittedly

04:17   7   strange to see yourself from somewhere else.

04:17   8   But then what I can do is I can tell it to go

04:17   9   into a special flight mode, and then this is the screen

04:17   10   that I see that I'm showing here.

04:17   11   And on this screen, there's an apply button

04:17   12   down here. And if I press on that, then what it does

04:17   13   is it records the distance between itself up in the sky

04:17   14   and me at that moment in time.

04:17   15   And I think somebody earlier, one of the

04:17   16   people, talked about the idea of an invisible leash.

04:17   17   It acts like there's a leash running from me to the

04:17   18   drone. So then if I run or hike or bicycle, it'll just

04:18   19   stay that same distance away from me as I go about my

04:18   20   business.

04:18   21   Q.   And how does the drone actually follow you?

04:18   22   A.   We can go to the next slide for that. Let me

04:18   23   clear the annotation.

04:18   24   The way the drone follows you, you also heard

04:18   25   about -- I think Dr. Michalson described this to you.

04:18   1   When I'm holding this and I have my phone in this, when

04:18   2   I tell it to start following me, the phone and this

04:18   3   controller send the aircraft the GPS location, the

04:18   4   latitude and longitude, of me. And so it knows where I

04:18   5   am. And it has its own GPS on board so it knows where

04:18   6   it is, and it can measure the difference between the

04:18   7   two.

04:18   8   And it keeps getting my position as I move

04:18   9   around. So as I walk around with this in my hand, I

04:18   10   keep sending it my position. And so it keeps knowing

04:18   11   where I am now, and it can adjust its position so that

04:18   12   it's still the same distance away from me.

04:19   13   Q.   And Dr. Michalson says that Follow Me feature

04:19   14   infringes Claim 1 of the '909 patent.

04:19   15   Do you agree?

04:19   16   A.   No.

04:19   17   Q.   Why not?

04:19   18   A.   Well, let's go to the patent.

04:19   19   Every word in the patent matters. So we need

04:19   20   to go through the words in the patent and see if we're

04:19   21   doing everything that the claim lays out. And I have

04:19   22   that cartoon on the left to kind of help us visually

04:19   23   understand where we're at.

04:19   24   Q.   Okay. Can you be a little more specific and

04:19   25   explain what limitations are missing in the Follow Me?

759

04:19   1   A.   Absolutely. Let's go forward one slide,

04:19   2   please.

04:19   3   The first limitation I want to talk about is

04:19   4   the idea that you have commanded data that has a

04:19   5   selected relative velocity.

04:19   6   With Follow Me, as I just described, it's

04:19   7   simply dealing with how far away it is from me. That

04:19   8   leash, it's a position leash. There is no commanded

04:19   9   data that represents selected relative velocity.

04:19   10   There's no relative velocity at all. And so we just

04:20   11   don't have that one.

04:20   12   Q.   And do you know that just from flying the

04:20   13   drone?

04:20   14   A.   Well, to be sure of my opinions, I did this

04:20   15   little circle of things. I circuited. I'd fly the

04:20   16   drone. I'd try and understand what it's doing, then

04:20   17   I'd look at the source code. I had access to all the

04:20   18   same software that Dr. Michalson had access to; so

04:20   19   thousands of lines of computer code written for the

04:20   20   brains in here.

04:20   21   And I'd look at the code and find the right

04:20   22   section and try and understand, what is it actually

04:20   23   doing? What is it being told to do?

04:20   24   And then I would talk to the engineers who

04:20   25   designed the software and ask them questions about

04:20   1   anything I was confused with.

04:20   2   Then I'd rinse and repeat. I'd go fly it some

04:20   3   more, look at the code some more, talk to the engineers

04:20   4   some more. And I repeat this until I really understand

04:20   5   how it works.

04:20   6   So it's just combination of flying, reading

04:20   7   really hairy computer code and talking to people. And

04:20   8   you have to do all three.

04:20   9   Q.   Is there anything else missing in the claim

04:20   10   from Follow Me?

04:20   11   A.   Yes. Second part we can talk about is, you'll

04:21   12   remember there was a whole element in that claim that

04:21   13   said receiving date -- I'm not going to get the

04:21   14   language right, but basically receiving data about

04:21   15   position and about movement of the reference vehicle.

04:21   16   I'm paraphrasing there, but the important part

04:21   17   is, as we talked about before, it has to know both the

04:21   18   position information -- it has to get that -- and it

04:21   19   has to receive the movement data. And you'll remember

04:21   20   it was transmitted. So it was through the air somehow.

04:21   21   And of course, as I just described, what we're

04:21   22   actually doing for Follow Me in the -- in these drones

04:21   23   is using GPS. And GPS is sending position data this

04:21   24   way to the drone.

04:21   25   It's called global positioning for a reason.

761

04:21   1   There is no movement data being received by the drone

04:22   2   about the reference vehicle. And, yes, to make the

04:22   3   claim work, I'm the reference vehicle. So I'm a ship

04:22   4   or a boat, or a car, or a truck or something.

04:22   5   Q.   Now, you were in here earlier. Do you recall

04:22   6   Dr. Michalson stating that the drone can just calculate

04:22   7   the movement data from the position data it receives?

04:22   8   A.   I remember that.

04:22   9   Q.   Do you agree that that meets Claim 1?

04:22   10   A.   I don't agree that it meets Claim 1.

04:22   11   Q.   Why?

04:22   12   A.   Because -- I'm sorry. Go ahead.

04:22   13   Q.   Why is that?

04:22   14   A.   I'm glad you asked.

04:22   15   Because he's talking about the fact that you

04:22   16   can use position data over time to compute something

04:22   17   called movement. And that's totally true. You can

04:22   18   compute movement.

04:22   19   But the claim language is what we care about.

04:22   20   Every word matters like everybody's been saying. And

04:22   21   it says in there that there's transmitted data, and

04:22   22   that we're receiving position data and we're receiving

04:22   23   movement data.

04:22   24   And that's just not happening if you're only

04:22   25   receiving position data because otherwise it'll --

04:23   1   element would just say receiving position data, and

04:23   2   then the aircraft can go through the trouble of

04:23   3   figuring out movement from that. And that's not what's

04:23   4   written down.

04:23   5   Q.   Well, why don't we pull up Joint Exhibit 2,

04:23   6   and why don't we take another look at Claim 1.

04:23   7   MR. SCHLESINGER: If we could -- yeah.

04:23   8   That's it.

        9   BY MR. SCHLESINGER:

04:23   10   Q.   Right there we have the receiver limitation.

04:23   11 So where is this requiring both position and movement

04:23   12 data?

04:23   13   A.   That's the text that I'd like you to really

04:23   14 look at carefully because it says there is a receiver.

04:23   15 So we know there's something on the aircraft receiving

04:23   16 something. We know that what it's receiving is

04:23   17 transmitted. So something is wirelessly flowing to the

04:23   18 aircraft.

04:23   19   And it says reference data here, and it

04:23   20 defines what that is. It's something that's

04:23   21 communicating a position and movements, and it's an

04:24   22 "and." It's not an "or." We need both parts.

04:24   23   Q.   So why is it that multiple pieces of position

04:24   24 data, why don't those just communicate movement data?

04:24   25   A.   Because then you're communicating position

763

04:24   1   data. You're simply not communicating the movement.

04:24   2   Q.   Now, does the claim elsewhere require

04:24   3   calculations?

04:24   4   A.   Sure.

04:24   5   Q.   And is there any calculation requirement

04:24   6   recited in the receiver limitation?

04:24   7   A.   Not in this one.

04:24   8   Q.   Do you think sending data that communicates a

04:24   9   position is equivalent to sending data that

04:24   10   communicates both position and movement?

04:24   11   A.   Not at all. And we actually heard testimony

04:24   12   from inventors talking about how important it is, like

04:24   13   we talked about before the break.

04:24   14   The movement data lets us do things like not

04:24   15   crash into the ship's surface when we're landing on it.

04:24   16   The movement data tells us, for the claim, what's

04:24   17   actually going on with the thing we're following. Is

04:25   18   it skipping laterally? And that's just not the same as

04:25   19   just knowing the position of the boat in the ocean.

04:25   20   Q.   And we talked about the Follow Me uses GPS

04:25   21   data. How accurate is GPS data?

04:25   22   A.   GPS data is accurate enough to give you

04:25   23   directions for your car, but I don't know if any of you

04:25   24   drive, for instance, on a frontage road here right

04:25   25   along the highway. And I've done this three or four

764

04:25   1   times in the last few days. I can be on the highway

04:25   2   and my GPS thinks I'm on the frontage road. I can be

04:25   3   on the frontage road and my GPS thinks I'm on the

04:25   4   highway and tells me to take the next exit.

04:25   5   So 20, 30 feet there, you can be that far off

04:25   6   with GPS. It can bounce around. If you take a series

04:25   7   of GPS readings, they aren't going to necessarily give

04:25   8   you any accuracy about swelling waves or rocking boats.

04:25   9   Q.   And were you here when the inventors testified

04:25   10 about why you needed movement data?

04:25   11   A.   I was.

04:25   12   Q.   And so what's your understanding as far as the

04:26   13 ship -- let me step back and strike that.

04:26   14   Could the inventors have changed the language

04:26   15 and just written communicating a position of a

04:26   16 reference vehicle?

04:26   17   A.   Sure.

04:26   18   Q.   But that's not what's claimed?

04:26   19   A.   That's not what they wrote.

04:26   20   MR. SCHLESINGER: Let's go back to the

04:26   21 slides, please.

        22 BY MR. SCHLESINGER:

04:26   23   Q.   Is there anything else missing from the claim

04:26   24 in Follow Me?

04:26   25   A.   Yes. Another one is in the claim when it tied

765

04:26   1   it all together and said there's a control system

04:26   2   essentially deciding what to do. It said it's

04:26   3   controlling selected relative velocity.

04:26   4   But like I said earlier, when I was talking

04:26   5   about this one, we're not using relative velocity in

04:26   6   these drones. They're using relative position, and so

04:26   7   we can't be controlling selected relative velocity.

04:26   8   Q.   And I believe earlier you said you reviewed

04:26   9   source code; is that right?

04:26   10   A.   That's correct.

04:27   11   MR. SCHLESINGER: Your Honor, I think

04:27   12   we're going to get into some confidential material. If

04:27   13   we may seal the courtroom.

04:27   14   THE COURT: Please.

04:27   15   Anyone who's not under the protective

04:27   16   order needs to absent themselves, please.

04:27   17   (Sealed proceedings.)

04:27   18   BY MR. SCHLESINGER:

04:27   19   Q.   And, Dr. Nourbakhsh, would you please turn to

04:27   20   Tab DX-743? That's Defendants' Exhibit 743.

04:27   21   A.   I'm there.

04:27   22   Q.   Do you recognize this document?

04:27   23   A.   I do. This is some of the source code that

04:27   24   was supplied to me and Dr. Michalson to evaluate how

04:27   25   the drones work.

766

04:27 1   Q.   Is this all of the source code you reviewed?

04:28 2   A.   No. If we had all the source code here, you

04:28 3   wouldn't be able to see my head. It's thousands and

04:28 4   thousands of lines of source code.

04:28 5   Q.   Did this source code inform your opinions on

04:28 6   whether or not DJI drones practice Claim 1?

04:28 7   A.   Yes.

04:28 8   MR. SCHLESINGER: Defendants -- or DJI

04:28 9   moves to admit Defendants' Exhibit 743.

04:28 10   MR. RICH: No objection.

04:28 11   THE COURT: Admitted.

04:28 12 BY MR. SCHLESINGER:

04:28 13   Q.   Now, do you recall Dr. Michalson also

04:28 14 referencing source code for the Follow Me feature?

04:28 15   A.   I do remember him. In his slides he had some

04:28 16 source code up on the screen.

04:28 17   Q.   Why don't we take a look at that?

04:28 18   MR. SCHLESINGER: Let's put up

04:28 19 Dr. Michalson's Slide 142.

       20 BY MR. SCHLESINGER:

04:28 21   Q.   Do you recognize this code?

04:28 22   A.   I do.

04:28 23   Q.   Do you agree with Dr. Michalson's description

04:28 24 of this code?

04:28 25   A.   No.

767

```
04:28    1        Q.    Why is that?

04:29    2        A.    Dr. Michalson showed this code.  And at the

04:29    3   top of the file it says: ████████████████████████████

04:29    4   ██████████████████████████████████████████████████

04:29    5              ████████████████████████████████████████

04:29    6   ████████████████████████████████████████████████

04:29    7   ██████████████████████████████████████████████████

04:29    8   ████████████████████

04:29    9              That's not how you make a leash.  The way you

04:29   10   make a leash is you keep the same distance away from me

04:29   11   at all times.

04:29   12              And he didn't talk about the actual lines.  I

04:29   13   thought it would be useful for you to see a few of the

04:29   14   lines.

04:29   15              So for instance here, ████████████████████████

04:29   16   ██████████████████████████████████████████████████

04:29   17   ██████████████████████     ████████████████████████████

04:29   18   ████████████████████████████████████████████

04:29   19   ██████████████████    ████████████████████████████████

04:29   20              And if we look down here, all it's actually

04:29   21   doing here is ████████████████████████████████████

04:29   22   ████████████████████    ████████████████████████████

04:30   23   ██████████████████████████████    ████████████████████████

04:30   24   ██████████████████████████    ██████████████████

04:30   25              And I think that Dr. Michalson may have
```

768

04:30	1	included this code because ███████████████████
04:30	2	█████████████████████████████████████
04:30	3	████████████████████████████ ████████████
04:30	4	████████████████████████████████████ ████
04:30	5	██
04:30	6	██████████
04:30	7	Q. And so in the first thing you highlighted on
04:30	8	Line 930, ███████ does that refer to -- what does that
04:30	9	refer to?
04:30	10	A. ██████████████████████████████
04:30	11	████████████████████████████████████
04:30	12	██████████████████████████████████████
04:30	13	███████████
04:30	14	Q. And you also mentioned velocity.
04:30	15	What are Lines 937 and 938 describing?
04:30	16	A. This is describing something interesting. ███
04:31	17	████████████████████████████ ███████
04:31	18	██████████████████████████████████
04:31	19	██
04:31	20	██████████████████ █████████████████████
04:31	21	███████████████████████████████████
04:31	22	██
04:31	23	██████████████████████████████████
04:31	24	██████████████████████████████████
04:31	25	█████████████████████ █████████████████████

769

04:31   1

04:31   2

04:31   3

04:31   4

04:31   5

04:31   6

04:31   7

04:32   8

04:32   9

04:32   10

04:32   11

04:32   12

04:32   13

04:32   14

04:32   15

04:32   16

04:32   17

04:32   18

04:32   19

04:32   20

04:32   21

04:32   22

04:32   23

04:32   24

04:32   25

770

04:32   1   ████████████████████

04:32   2   Q.   And so at the top of the slide Dr. Michalson

04:32   3   stated that the DJI drones with Follow Me include

04:33   4   precoded algorithms that set the drone's velocity to an

04:33   5   estimated velocity of the target.

04:33   6   And do you see anywhere in this code that does

04:33   7   that?

04:33   8   A.   No.

04:33   9   Q.   And just, if you could indulge me, what is the

04:33   10 control base in DJI's Follow Me?

04:33   11   ████████████████████████████████

04:33   12 ██   ████████████████████████████████████

04:33   13 ██

04:33   14 ██

04:33   15 ███

04:33   16 ███

04:33   17 ████████████████████████████████████   ████████████

04:33   18 ██████████████████

04:33   19   Q.   How can you be so sure that's how it operates?

04:33   20   A.   Because I've used the drone. I've read all

04:33   21 the software. I've studied Dr. Michalson's arguments

04:33   22 and looked at the parts of software that he pointed out

04:33   23 to make sure I understand how they work. And I've

04:33   24 talked to the engineers who wrote it and listened to

04:34   25 them explain to me how it works.

771

04:34 1   MR. SCHLESINGER: And if we could go back

04:34 2   to the slides, please.

04:34 3   BY MR. SCHLESINGER:

04:34 4   Q.   And just to summarize, does the DJI drones

04:34 5   with Follow Me meet the requirement for a selected --

04:34 6   I'm sorry -- for controlling based on selected relative

04:34 7   velocity?

04:34 8   A.   No.

04:34 9   MR. SCHLESINGER: And, Your Honor, we can

04:34 10   unseal the Court now for a little bit.

04:34 11   THE COURT: Great. Thank you for letting

04:34 12   me know.

09:42 13   (Sealed proceedings end.)

04:34 14   BY MR. SCHLESINGER:

04:34 15   Q.   And what about the final limitation?

04:34 16   A.   You'll recall the final limitation was the

04:34 17   idea that there's a selected relative velocity

04:34 18   preprogrammed prior to flight. I think I got close to

04:34 19   the right language there.

04:34 20   And that limitation -- we just talked about

04:34 21   commanded data, and we talked about how it says

04:34 22   selected relative velocity.

04:34 23   The problem is, of course, the DJI drones

04:34 24   don't do relative velocity. They're doing position.

04:34 25   They're doing that leash. So there is no commanded

772

04:35   1   data and, therefore -- your X looks much better than

04:35   2   mine. I'll take mine away.

04:35   3   Q.   And so do DJI drones infringe Claim 1 of the

04:35   4   '909 patent?

04:35   5   A.   No. They don't.

04:35   6   Q.   Do they literally infringe Claim 1 of the '909

04:35   7   patent?

04:35   8   A.   No. They don't.

04:35   9   Q.   Do they infringe Claim 1 of the '909 patent

04:35 10   under the doctrine of equivalents?

04:35 11   A.   No. They do not.

04:35 12   Q.   Do they indirectly infringe Claim 1 of the

04:35 13   '909 patent?

04:35 14   A.   No. They don't.

04:35 15   Q.   And what does this slide show?

04:35 16   A.   This slide is just showing you a review just

04:35 17   so that you have it. On Claim 1, all the sections that

04:35 18   are highlighted in red, those are the sections I've

04:35 19   tried to explain my opinion on why they are not

04:35 20   infringed by these drones.

04:35 21   Q.   We've heard Textron's witnesses refer to the

04:36 22   '909 patent as the Follow Me patent or the follow

04:36 23   patent.

04:36 24   So why doesn't DJI's Follow Me feature

04:36 25   infringe what they call the follow patent?

773

04:36 1   A.   Well, I'll say it one more time. Words

04:36 2   matter. They can call the patent whatever they want,

04:36 3   but that doesn't change that what matters is what's in

04:36 4   the claim. It's not about what the patent hopes to do

04:36 5   generally. It's about what's in the claim.

04:36 6   And when you go through the claim line by

04:36 7   line, we find all these sections that the drone doesn't

04:36 8   practice. And that makes sense because we've also

04:36 9   heard a lot of talk about landing on a boat with a big

04:36 10 aircraft. This is just pretty different.

04:36 11   And so it's not very surprising that these

04:36 12 drones don't do what the claim describes.

04:36 13   Q.   Why don't we move on to ActiveTrack?

04:36 14   A.   Sure. Let's go to the next slide. Thank you.

04:36 15   Q.   Can you describe what ActiveTrack is?

04:37 16   A.   Yes. This is an entirely other mode. It's

04:37 17 the only other mode that DJI accuses of infringing this

04:37 18 patent. So it's the last one we have to talk about for

04:37 19 this patent -- or this claim.

04:37 20   And what ActiveTrack does is lets you take

04:37 21 anything -- I think we heard about a cocker spaniel

04:37 22 from Dr. Michalson or a boat or a car or a human being

04:37 23 running, and ActiveTrack lets you tell the drone, hey.

04:37 24 You see that? You see that person or being down there?

04:37 25 Follow them, and it follows them.

774

04:37   1   Q.   How do you start ActiveTrack?

04:37   2   A.   Let's go to the next slide, and I'll talk you

04:37   3   through it.

04:37   4   I guess we do it on the same slide. We'll

04:37   5   just do it on this slide. How's that?

04:37   6   Q.   That works.

04:37   7   A.   It's much the same way but with one very

04:37   8   special difference. So to start ActiveTrack, go to the

04:37   9   river, take the drone out, turn it on, send it up into

04:37   10   the sky.

04:37   11   And remember, I'll have my phone up here with

04:38   12   the video image so I can see whatever the camera here

04:38   13   is seeing.

04:38   14   So I send this up in the sky with ActiveTrack,

04:38   15   position it just where I want for that nice view of me

04:38   16   running or maybe it's, you know, my son who's doing

04:38   17   mountain biking. So maybe that's more interesting.

04:38   18   We're going to point it at my son. He really

04:38   19   is a mountain biker so this makes sense.

04:38   20   So we're going to position this with him and

04:38   21   his mountain bike, and now we see him on the screen

04:38   22   here.

04:38   23   So to start ActiveTrack, we're literally going

04:38   24   to, on the screen, on the image, identify him just by

04:38   25   dragging our finger across his image on the screen.

775

04:38 1   That's how you start ActiveTrack.

04:38 2   Q.   And both ActiveTrack and Follow Me, can you

04:38 3   start those while the drone's on the ground?

04:38 4   A.   No.

04:38 5   Q.   What's required before you start them?

04:38 6   A.   They have to be in the sky. They have to be

04:38 7   flying already. You have to have manually taken off

04:38 8   already.

04:38 9   In the case of ActiveTrack, it better be

04:39 10   pointed at the object you want to follow so you can

04:39 11   push with your finger on that object on the screen.

04:39 12   Q.   And what's the -- on the slide that's shown

04:39 13   here, what's that green box?

04:39 14   A.   When you identify the -- for instance, in this

04:39 15   case, this is Dr. Michalson's slide. So that's

04:39 16   Dr. Michalson. When you drag your finger, for

04:39 17   instance, from the top right -- top left to the bottom

04:39 18   right corner, that box here is identifying where it's

04:39 19   going to look in its vision system for the person that

04:39 20   it's going to be tracking.

04:39 21   Q.   And I believe you said that that was

04:39 22   transmitted to the drone.

04:39 23   How many times is that box sent?

04:39 24   A.   This is pretty important. It -- when you

04:39 25   start ActiveTrack, this sends to the drone, just one

776

04:39   1   time, the location of that person, like Dr. Michalson

04:39   2   in the image, just one time. And the location is just

04:39   3   the pixels. It's just the location on the screen, like

04:39   4   3 inches to the right, 2 inches up on the screen.

04:40   5   That's what gets sent.

04:40   6   Q.   Dr. Michalson says that ActiveTrack infringes

04:40   7   Claim 1.

04:40   8   Do you agree?

04:40   9   A.   No.

04:40   10   Q.   What claim limitations are missing from

04:40   11 ActiveTrack?

04:40   12   A.   Let's go to the next slide and we can -- of

04:40   13 course, we can go faster because on some of it, it's

04:40   14 exactly the same as before.

04:40   15   The first limitation we talked about last time

04:40   16 for Follow Me was this idea that there's commanded data

04:40   17 that is selected relative velocity. And you'll recall

04:40   18 what I said was, it's using position in Follow Me. So

04:40   19 it can't have relative velocity. This can't exist.

04:40   20   And this is the same story except, of course,

04:40   21 all we're sending up is that image.

04:40   22   Furthermore, just like Follow Me, ActiveTrack

04:40   23 creates a leash. Once it sees that person that it's

04:40   24 going to follow, it does the same thing as Follow Me.

04:40   25 It makes a distance, and it keeps that distance the

777

04:41   1   same as you move around.

04:41   2   Q.   Is there anything else missing from

04:41   3   ActiveTrack?

04:41   4   A.   Yes. Go ahead and go forward one slide.

04:41   5   The next thing we talked about last time was

04:41   6   that the claims spell out pretty clearly that you're

04:41   7   receiving position and movement data about the

04:41   8   reference vehicle, which in this case is the dog or

04:41   9   the -- oh, my son on the mountain bike. That's the

04:41 10   reference vehicle.

04:41 11   But the only thing that the aircraft is

04:41 12   receiving is the location of the little pixels in the

04:41 13   image on the controller. That's all. So not only is

04:41 14   it not receiving movement data, just like Follow Me,

04:41 15   it's not receiving position data either.

04:41 16   Q.   Now, if it's not receiving position or

04:41 17   movement data, how does it follow somebody?

04:41 18   A.   Because of the smarts in here that the company

04:41 19   created. Because what happens is this looks at my son

04:42 20   on the mountain bike and is able to tell where my son

04:42 21   is in the real world from the position of the drone,

04:42 22   the angle of the camera, some basic geometry.

04:42 23   So the aircraft is figuring out the position

04:42 24   of my son, then using that to figure out its distance

04:42 25   to my son, and then it's using that to follow him.

778

04:42   1   Q.   And I think you referred to this, and I

04:42   2   believe you're pointing to the camera; is that right?

04:42   3   A.   Yes.   I was pointing to the camera on the

04:42   4   drone.

04:42   5   Q.   So it's the camera that figures out the

04:42   6   position and movement --

04:42   7   A.   Well, the --

04:42   8   Q.   -- or --

04:42   9   A.   -- the computer vision system in here, the

04:42   10 brains figure that out, but it uses the image from the

04:42   11 camera.

04:42   12   Q.   Now, Dr. Michalson says that that is enough to

04:42   13 meet the position and movement requirements of Claim 1.

04:42   14   Do you agree?

04:42   15   A.   No.

04:42   16   Q.   He also says that that's equivalent if -- even

04:42   17 if it's not literally.

04:42   18   Do you agree with that?

04:42   19   A.   No.

04:42   20   Q.   Why is -- why is it not equivalent if it's

04:43   21 figuring it out on its own?

04:43   22   A.   Because you have to read the words of the

04:43   23 claim.   The claim says this transmitted data

04:43   24 communicates position and communicates movement.

04:43   25   When you're sending pixels on a screen, all

779

04:43   1   the hard work, all the calculation's being done here.

04:43   2   And it's not at all equivalent to say that this is

04:43   3   figuring something out. That's not equal to saying

04:43   4   that it's receiving information.

04:43   5   Q.   And just to be clear, it's using the camera to

04:43   6   figure out where the object is it's following?

04:43   7   A.   It's using the image from the camera. So it's

04:43   8   not using GPS signals from here at all.

04:43   9   Q.   And that image is only sent how many times?

04:43   10   A.   One time at the very beginning. So you're

04:43   11 never receiving even -- you know, when you had the

04:43   12 argument about how, well, if you send two or three

04:43   13 positions over time, you can figure out movement. This

04:43   14 doesn't even do that.

04:43   15   ActiveTrack's only sending the image

04:43   16 information one time. So even if this is figuring out

04:44   17 movement data, it couldn't be doing it from successive

04:44   18 position readings, like driving from Fort Worth to

04:44   19 here.

04:44   20   Q.   And earlier we talked about what the '909 --

04:44   21 well, let me strike that.

04:44   22   Is there anything else missing from

04:44   23 ActiveTrack?

04:44   24   A.   Yes.

04:44   25   Q.   What's that?

780

04:44   1   A.   We had another limitation, the big paragraph

04:44   2   limitation, that puts it all together, but, again, that

04:44   3   paragraph limitation said controlling for a selected

04:44   4   relative velocity.

04:44   5   Just like we talked about before, we're not

04:44   6   using velocity. We're using that distance leash. So

04:44   7   this is not met either.

04:44   8   Q.   What do you mean by "that distance"?

04:44   9   A.   I mean ActiveTrack, just like Follow Me, is

04:44   10 controlling to maintain a set distance from my son.

04:45   11   Q.   And how do you know that?

04:45   12   A.   Because the code makes it really clear. And I

04:45   13 talked to the engineers that wrote ActiveTrack as well.

04:45   14 And I used it, not with my son on the mountain bike, I

04:45   15 used it with myself.

04:45   16   MR. SCHLESINGER: And, Your Honor, I

04:45   17 think we're going to get back into the confidential.

04:45   18   THE COURT: Okay.

04:45   19   (Sealed proceedings.)

04:45   20 BY MR. SCHLESINGER:

04:45   21   Q.   And, again, do you recall Dr. Michalson

04:45   22 referring to source code for this limitation?

04:45   23   A.   I do. He had a slide where he put some source

04:45   24 code up.

04:45   25   MR. SCHLESINGER: Why don't we put that

04:45 1   slide up? I believe it's Slide 143 from Dr. Michalson.

       2   BY MR. SCHLESINGER:

04:45 3   Q.   What is this code describing?

04:46 4   A.   I'm going to take a second to remind myself

04:46 5   what this code is describing.

04:46 6   So at the top of the screen Dr. Michalson is

04:46 7   saying that -- or suggesting that this code is setting

04:46 8   the drone's velocity to an estimated velocity.

04:46 9   In fact, what this code is doing is very

04:46 10 different. ██

04:46 11 ██

04:46 12 ████████████████   ████████████████████████████

04:46 13 ██████████████████████████   ██████████████████

04:46 14 ██

04:46 15 ████████████████████████████

04:46 16   █   ████████████████████████████████

04:46 17 ██████████████████████████████

04:46 18   █   ████

04:46 19   █   ████████████████████████████████   ████

04:46 20 ██████████████████████████████████

04:47 21   █   ████   ████████████████████████

04:47 22   █   ██████████

04:47 23   █   ██████████████████████████

04:47 24   Q.   Did you review code that did describe how the

04:47 25 ActiveTrack follows the object?

782

04:47	1	A. Yes.
04:47	2	Q. And if you could take a look at Exhibit 743
04:47	3	that we were looking at a moment ago and turn to
04:47	4	Page 1150?
04:47	5	MR. SCHLESINGER: And if we could bring
04:47	6	that up as well.
04:47	7	A. You can get a flavor for the code now. You're
04:47	8	seeing what it looks like.
04:47	9	BY MR. SCHLESINGER:
04:47	10	Q. What does this code describe?
04:47	11	██ ████████████████████████████████████
04:47	12	██
04:47	13	████████████████████████████████
04:47	14	██
04:47	15	██
04:48	16	██████████████████████████████████
04:48	17	██████████████████████████████
04:48	18	██████████████████
04:48	19	Q. And where do you see that?
04:48	20	And if you need us to scroll, just let us
04:48	21	know.
04:48	22	A. Can you zoom out slightly?
04:48	23	Thank you.
04:48	24	Q. And there's a paper copy, if it's easier.
04:48	25	██ ████████████████████████████████

783

04:48	1	████████████████████████████████████
04:48	2	█████████████████████████████ █
04:48	3	██████████████████
04:49	4	████████████████████████████
04:49	5	████████████████████████████████████
04:49	6	██████████████████████████
04:49	7	██████████████████████
04:49	8	█████████████████████████████████
04:49	9	██████████████ ████████████████████
04:49	10	██████████████████████████████████
04:49	11	██████████████████████████████████
04:49	12	██████████████████████ █████████████
04:49	13	████████████████████████████████████
04:49	14	█████████████
04:49	15	███████████████████████████
04:49	16	██████████████████████████████
04:49	17	█████████████████████████████████
04:49	18	██████
04:49	19	Q. What does this tell you about how DJI drones
04:49	20	follow an object in ActiveTrack?
04:49	21	A. ████████████████████████████
04:50	22	████████████████████████████████████
04:50	23	██████████
04:50	24	MR. SCHLESINGER: And we can go back to
04:50	25	the slides.

784

04:50   1   And we can unseal the court, if you'd

04:50   2   like, Your Honor.

04:50   3   THE COURT: Thank you.

09:42   4   (Sealed proceedings end.)

04:50   5   BY MR. SCHLESINGER:

04:50   6   Q.   Is there anything else -- actually let's --

04:50   7   yeah. Is there anything else missing from Claim 1 for

04:50   8   ActiveTrack?

04:50   9   A.   Just one more. It's our last island

04:50   10 limitation. You'll recall again that that last

04:50   11 limitation said that there's commanded data

04:50   12 representing selected relative velocity that is

04:50   13 preprogrammed prior to flight. And, again, we don't

04:50   14 have relative velocity. We just described that this is

04:50   15 all position-based.

04:50   16   And so we don't have this -- we're not

04:50   17 practicing this element. The last -- this is the last

04:50   18 line in that claim either.

04:50   19   Q.   And can you summarize your opinions for

04:51   20 ActiveTrack and Follow Me on whether they infringe

04:51   21 Claim 1 of the '909 patent?

04:51   22   A.   I believe Follow Me and ActiveTrack do not

04:51   23 infringe Claim 1. And I've, on the right side, shown

04:51   24 you in red the parts that they don't infringe. At the

04:51   25 same time, on the left side, I've X'd them out in my

785

04:51   1   graphic.

04:51   2   And the only exception here is this one.

04:51   3   That's for ActiveTrack. Follow Me does send position.

04:51   4   ActiveTrack doesn't even send position, but that

04:51   5   limitation says you have to send position and movement.

04:51   6   So movement is missing from both of them.

04:51   7   Q.   If any one of these limitations are found to

04:51   8   be missing from Follow Me or ActiveTrack, what does

04:51   9   that mean?

04:51   10   A.   That means that the drones do not infringe.

04:51   11   Follow Me and ActiveTrack don't infringe this claim.

04:51   12   Q.   Now, do you believe following an object using

04:51   13   position is equivalent to following an object using

04:52   14   velocity?

04:52   15   A.   No. Not at all.

04:52   16   Q.   And do you recall the patent describing

04:52   17   station-keeping?

04:52   18   A.   Yes. I do.

04:52   19   Q.   Are there multiple ways to do station-keeping?

04:52   20   A.   Yes. And we've had people here talk about

04:52   21   that.

04:52   22   Q.   What are those ways?

04:52   23   A.   Well, people have talked about this idea. We

04:52   24   could -- station-keeping -- by the way, just to remind

04:52   25   us about the word -- is let's say you have a boat

04:52   1   moving along. You have an aircraft that tries to just

04:52   2   go along with the boat. So it doesn't get any closer,

04:52   3   doesn't get any further. It just moves along with the

04:52   4   boat.

04:52   5   And one way of doing station-keeping is to try

04:52   6   and have your velocities match, your speeds match.

04:52   7   Another way of doing station-keeping is to keep your

04:52   8   distance exactly the same, to keep your relative

04:52   9   positions the same. And they're entirely different

04:52   10   ways. They have different advantages and

04:52   11   disadvantages.

04:52   12   Q.   Why would one station-keep or hold a

04:52   13   position -- I'm sorry.

04:52   14   Why would one station-keep using relative

04:52   15   velocity?

04:52   16   A.   Well, if you have something that's pitching

04:53   17   and rolling significantly, and if you're getting

04:53   18   movement data from it like what the claim suggests and

04:53   19   the patent suggests, you can use that velocity data to

04:53   20   keep kind of following it. That's, like, part of what

04:53   21   the Blue Angels are doing when they're really careful

04:53   22   about formation flight.

04:53   23   Q.   If you're following with relative velocity and

04:53   24   you get blown off course, what happens?

04:53   25   A.   If you're station-keeping by keeping your

787

04:53   1   velocities matched and you move a couple inches out,

04:53   2   you're still going to match your velocities because you

04:53   3   care about the general configuration. You're caring

04:53   4   about being in roughly the same place.

04:53   5   You're not being really insistent that you

04:53   6   have the exact same distance. You're trying to keep

04:53   7   the velocities matched. So if they slow down, you slow

04:53   8   down. That doesn't mean you're in the exact same

04:53   9   position. It means you're moving at the same speed.

04:53   10   Q.   Why would that be important for an aircraft

04:53   11   that's following or landing on a ship?

04:53   12   A.   Because -- and the inventors kind of talked

04:54   13   about this -- as the speeds of the ship change, what

04:54   14   matters even more than your position is whether you're

04:54   15   matching the motions of the ship so that there's no

04:54   16   sudden difference in how fast you're closing.

04:54   17   Because remember, with relative velocity, you

04:54   18   could be telling a ship I want to approach you at 5

04:54   19   miles an hour. If you're doing that and it starts

04:54   20   bucking and you aren't compensating for that, your 5

04:54   21   miles an hour could become 10 miles an hour just for a

04:54   22   moment. And if that happens at the wrong time, you're

04:54   23   done.

04:54   24   Q.   Is that how DJI products work?

04:54   25   A.   Not at all.

788

04:54   1   Q.   How do they work?

04:54   2   A.   We match relative position. So if I know your

04:54   3   GPS position or if I figured out your position, and I

04:54   4   know my position, DJI products are just using that

04:54   5   leash.

04:54   6   You know what it's like? It's like an

04:54   7   old-fashioned ruler that folds out and is rigid and

04:55   8   wooden. That's what it's like. It's a wooden ruler.

04:55   9   That's keeping your distance.

04:55   10   And when somebody moves, we move with them as

04:55   11   if there's just this bar between us. That's

04:55   12   position-based and distance-based. It's not based on

04:55   13   measuring velocity and subtracting the two velocities.

04:55   14   Q.   What's generally the purpose of Follow Me and

04:55   15   ActiveTrack?

04:55   16   A.   Well, in the DJI case, the position matters

04:55   17   incredibly because the whole point is you're making a

04:55   18   video. So as you move around, you want to have the

04:55   19   exact same distance and you want to have the same video

04:55   20   image in that camera so you make a nice video. If it

04:55   21   drifts gradually because it's just maintaining

04:55   22   velocity, you're going to be very unhappy when you get

04:55   23   finished with your mountain biking ride and you're

04:55   24   barely in the frame at the end. You're just kind of

04:55   25   off on the left side. So you really care about

789

04:55   1   position for this because you're making a video.

04:55   2   Q.   How would the video look if a person's jerking

04:55   3   around and the drone was following using relative

04:56   4   velocity?

04:56   5   A.   Well, that would be the kind of video that

04:56   6   makes me dizzy. Because then, as a mountain biker

04:56   7   twists and turns, and this twists and turns really fast

04:56   8   with them, you're just going to get nauseous watching

04:56   9   the video. It's going to look like somebody was

04:56   10   filming it who was hyperactive.

04:56   11   Q.   And would that not occur if you're using

04:56   12   relative position?

04:56   13   A.   No.

04:56   14   Q.   Why not?

04:56   15   A.   Because you're just maintaining the same

04:56   16   distance and relative position and, therefore, you're

04:56   17   going to do your best to keep the mountain bike in the

04:56   18   frame. But you're not going to let yourself get too

04:56   19   far away or too close.

04:56   20   Q.   Let's turn to Claim 7 which is also asserted

04:56   21   in this case.

04:56   22   What's your opinion with respect to whether

04:56   23   DJI drones with Follow Me or ActiveTrack infringe

04:56   24   Claim 7?

04:56   25   A.   I believe these drones with Follow Me and

790

04:56   1   ActiveTrack do not infringe Claim 7 either.

04:56   2   Q.   Is Claim 7 similar to Claim 1 of the '909

04:57   3   patent?

04:57   4   A.   We heard this from Dr. Michalson too. It is

04:57   5   very similar, yes.

04:57   6   Q.   Can you walk us through -- and we don't have

04:57   7   to rehash everything, of course, but walk us through

04:57   8   the elements as far as why the --

04:57   9   A.   Sure. Let's go to the next slide. I kind of

04:57   10   lay it out that way.

04:57   11   Q.   I think we're on the right slide.

04:57   12   A.   We're on the right slide. You're right, my

04:57   13   bad.

04:57   14   So if we just skip down to the receiver part,

04:57   15   Claim 7 says here that we're receiving transmitted

04:57   16   data, communicating position and movement. The only

04:57   17   difference is it's got this language relative to earth,

04:57   18   and Dr. Michalson called that out too. So it's just

04:57   19   being really specific about that.

04:57   20   But just like before, we aren't sending

04:57   21   movement data ever with ActiveTrack or Follow Me. That

04:58   22   got really busy-looking.

04:58   23   We aren't sending movement data at all. And

04:58   24   the relative to earth part doesn't change my opinion on

04:58   25   that. And we're not sending position data with

791

04:58   1   ActiveTrack. So that kind of takes care of that

04:58   2   limitation.

04:58   3   Q.   And ActiveTrack, when you're selecting that

04:58   4   bounding box, is the pixels -- is that relative to

04:58   5   earth?

04:58   6   A.   No. It's relative to the -- your phone. It's

04:58   7   relative to the screen on your phone. So it's not

04:58   8   relative to earth. No matter how you move the

04:58   9   surrounding, it won't change.

04:58   10   Q.   What about the control system limitation of

04:58   11 Claim 7? What's your opinion with respect to that?

04:58   12   A.   So this is the big paragraph, and it's the

04:58   13 same as it was in Claim 1. If you look at the

04:58   14 differences -- I'll try and identify the differences

04:58   15 real quickly.

04:59   16   In this case, we still need the data received

04:59   17 by the receiver. So that part's still the same. And

04:59   18 of course, we don't have position and movement data

04:59   19 coming in.

04:59   20   I'm going to read the rest: Adapted to

04:59   21 command flight control devices, a selected position

04:59   22 relative to reference vehicle or a selected velocity

04:59   23 relative to the reference vehicle.

04:59   24   Look at Slide 2.41.

04:59   25   And so we, of course, don't have a selected

792

04:59   1   velocity relative to reference vehicle here.

04:59   2   Q.   And I see claim -- the last limitation also

04:59   3   refers to a selected position.

04:59   4   What does it require of that selected

04:59   5   position?

04:59   6   A.   Do you mean the wherein clause at the bottom?

05:00   7   Q.   Yes.

05:00   8   A.   Let me clear the annotation.

05:00   9   So this wherein clause says that: The

05:00   10   selected position and velocity is selected and input

05:00   11   prior to flight.

05:00   12   So again, it's a position and a velocity. And

05:00   13   of course, because our drones aren't using a selected

05:00   14   velocity, they don't satisfy that "and."

05:00   15   Q.   And when is it determined what distance the

05:00   16   drone should follow in either Follow Me or ActiveTrack,

05:00   17   at what point?

05:00   18   A.   You've taken off, you're in the sky and only

05:00   19   then can you turn them on and figure out the distance,

05:00   20   because the distance depends on where you are and where

05:00   21   the drone is. So it's not prior to flight.

05:00   22   Q.   And when you're in the sky, you're flying; is

05:00   23   that right?

05:00   24   A.   Right.

05:00   25   Q.   So in summary, what -- does the DJI drones

793

05:00   1   with Follow Me or ActiveTrack literally infringe

05:01   2   Claim 7 of the '909 patent?

05:01   3   A.   No.

05:01   4   Q.   What about under the equivalents?

05:01   5   Do they meet that?

05:01   6   A.   No. They don't.

05:01   7   Q.   And why is that not equivalent?

05:01   8   A.   For just the same reasons as Claim 1. Because

05:01   9   using relative velocity to track something and move

05:01   10   along with it simply isn't the same as using this fixed

05:01   11   idea of a leash, of a distance. It just doesn't behave

05:01   12   the same way.

05:01   13   Q.   Okay. I believe there's other claims at issue

05:01   14   in this case, right?

05:01   15   A.   Yes. There are.

05:01   16   Q.   Why don't we turn to Claim 10 and 11?

05:01   17   A.   This is much easier.

05:01   18   Q.   What's your opinion with respect to whether

05:01   19   the DJI drones with ActiveTrack or Follow Me infringe

05:01   20   Claim 10?

05:01   21   A.   They don't infringe Claim 10.

05:01   22   Q.   And why is that?

05:01   23   A.   Claim 10 builds on Claim 7. So it takes

05:01   24   everything you saw in Claim 7 and adds another

05:01   25   requirement that must be satisfied to infringe, which

794

05:02   1   is, you know, before we had position and movement data

05:02   2   about me, about the boat.

05:02   3   Here, we still have position and movement data

05:02   4   about me or about the boat, the reference vehicle, but

05:02   5   it makes an additional requirement that it's

05:02   6   transmitted from the reference vehicle.

05:02   7   So to meet this, it would have to be

05:02   8   specifically this reference vehicle, me and the remote,

05:02   9   that are sending the position and movement data up.

05:02   10   And so since we don't do that, we don't do it from here

05:02   11   either.

05:02   12   Q.   And if DJI drones with Follow Me and

05:02   13   ActiveTrack don't infringe Claim 7, could they ever

05:02   14   infringe Claim 10?

05:02   15   A.   No. They automatically can't.

05:02   16   Q.   And what about Claim 11? If DJI drones with

05:02   17   ActiveTrack and Follow Me do not infringe Claim 7,

05:02   18   could they ever infringe Claim 11?

05:02   19   A.   No. Because it's that type of claim called a

05:02   20   dependent claim.

05:02   21   Q.   So in summary, what is your opinion on whether

05:02   22   the DJI drones with Follow Me infringe any of the

05:03   23   asserted claims of the '909 patent?

05:03   24   A.   They don't infringe any of these claims.

05:03   25   Q.   And we've heard the term "relative inertial

795

05:03 1   velocity"?

05:03 2   A.   Yes.

05:03 3   Q.   Is that what the '909 patent is about?

05:03 4   A.   Absolutely. Yes.

05:03 5   Q.   Is that similar to DJI drones?

05:03 6   A.   No. Because they are using distance and

05:03 7   position instead.

05:03 8   Q.   And just to confirm, is it your opinion that

05:03 9   the DJI drones with Follow Me and ActiveTrack do not

05:03 10 literally infringe the asserted claims of the '909

05:03 11 patent?

05:03 12   A.   Correct.

05:03 13   Q.   And what about under the doctrine of

05:03 14 equivalents?

05:03 15   A.   They do not infringe under the doctrine of

05:03 16 equivalents either.

05:03 17   Q.   And what about indirect infringement?

05:03 18   A.   My opinion is they don't infringe even under

05:03 19 indirect infringement.

05:03 20   Q.   Why don't we shift gears and move on to the

05:03 21 '752 patent.

05:03 22   Can you describe what the '752 patent is about

05:03 23 generally?

05:03 24   A.   Sure. And y'all heard Mr. Christensen talking

05:04 25 about this two days ago. So this will be refresher

05:04   1   kind of.

05:04   2   The '752 patent is really about making --

05:04   3   coming up with ways to make a helicopter safer to fly.

05:04   4   And you want to be able to understand when and how the

05:04   5   person flying the helicopter can depend on the

05:04   6   helicopter to keep the helicopter stable to keep them

05:04   7   out of danger.

05:04   8   Q.   What are we showing in this demonstrative?

05:04   9   A.   This is the inside of actually Bell -- I'm

05:04   10   pretty sure this is a Bell helicopter. And it's

05:04   11   important to see this, because when you're a helicopter

05:04   12   pilot, you've got all of these controls in your hands

05:04   13   and on your feet actually. And I love doing this.

05:04   14   This is a lot of fun. It's like playing the pipe

05:04   15   organ. You're using all your extremities at the same

        16   time.

05:04   17   But what's going on is this patent is saying,

05:04   18   it can be really hard to fly this thing. Can I

05:04   19   sometimes let go of the controls and have the

05:04   20   helicopter be safe and keep me out of trouble?

05:05   21   Q.   What problems were the '752 patent trying to

05:05   22   solve?

05:05   23   A.   Let's go to the next slide.

05:05   24   Right off the bat, the patent talks about this

05:05   25   issue of brownout, which is very dangerous. And this

797

05:05   1   happens because, unlike an airplane that's moving

05:05   2   quickly through the air, the helicopter can be almost

05:05   3   in the same position for a long time, hovering.

05:05   4   And as the rotor spins on the helicopter, it

05:05   5   pushes down wind that can cause dust to come back up,

05:05   6   and that dust can surround the cockpit, and then the

05:05   7   helicopter pilot might not be able to see what's

05:05   8   happening.

05:05   9   This is a really big deal because we use

05:05   10   helicopters already in dangerous circumstances, like

05:05   11   emergency search and rescue. If there's a foggy

05:05   12   highway and there's a crash, like five-vehicle crash,

05:05   13   we need a helicopter there.

05:05   14   And if there's a war and we're bringing

05:05   15   soldiers to the war, trying to get wounded out of the

05:05   16   war, we have to get a helicopter there no matter how

05:05   17   bad the conditions are.

05:06   18   And so this can happen because you simply

05:06   19   can't avoid these situations when you're in a

05:06   20   helicopter.

05:06   21   Q.   I saw you gesturing.

05:06   22   MR. SCHLESINGER: May I approach,

05:06   23   Your Honor?

05:06   24   A.   Thank you.

05:06   25   BY MR. SCHLESINGER:

798

05:06   1   Q.   What are the consequences of brownout?

05:06   2   A.   Let's go to the next slide.

05:06   3   The Christensen patent actually talks about

05:06   4   that, and it's a pretty surprising statistic. But just

05:06   5   brownout, just this issue of not being able to see out

05:06   6   of the helicopter's windscreen, has caused more damage

05:06   7   to helicopters and associated deaths of helicopter

05:06   8   pilots than everything else during the last two wars we

05:06   9   fought in. It's that dangerous and that common.

05:06   10   Q.   Now, you keep referring to helicopters.

05:06   11   Could you describe what are the controls of a

05:06   12   helicopter?

05:06   13   I think you alluded to that earlier.

05:06   14   A.   Yes. I think that's helpful to understand the

05:06   15   patent.

05:06   16   So there's several controls in the helicopter

05:07   17   we're going to worry about. One interesting thing

05:07   18   already, you'll notice that the helicopter pilot sits

05:07   19   in the right seat. So when I fly an airplane, the

05:07   20   pilot's in the left seat, just like you see a captain

05:07   21   and copilot get on board, like, a Southwest Airlines

05:07   22   flight. But in a helicopter, the pilot sits on the

05:07   23   right side. And I don't know why, but it's been like

05:07   24   that forever.

05:07   25   So the helicopter controls we're going to

05:07	1	start with, there's a cyclic in my right hand, there's
05:07	2	a collective in my left hand that goes up and down like
05:07	3	a parking brake, and then there's two pedals for my two
05:07	4	feet.
05:07	5	And let's just talk about the cyclic first.
05:07	6	You can go ahead and go to the next slide.
05:07	7	That cyclic control can move in any direction,
05:07	8	like this. You can go left, right, forward, backward,
05:07	9	any way you want. When I push it forward, it pitches
05:07	10	forward like that. So that's how I make the helicopter
05:07	11	put some of its thrust back and accelerate and take
05:07	12	off.
05:07	13	If I'm flying fast and I pull back on the
05:07	14	cyclic, it flares like that, puts some of the thrust
05:07	15	forward and slows down gradually. So for landing, I'll
05:07	16	do a whole lot of that, and then gradually add engine
05:08	17	power and come down for a landing.
05:08	18	So that's the cyclic in the forward and
05:08	19	backward direction. That's called longitudinal here,
05:08	20	but it's just forward and backward.
05:08	21	What the helicopter does when you do that is
05:08	22	called pitch. That's the change in the
05:08	23	forward/backward attitude.
05:08	24	Let's go to the next slide.
05:08	25	When I take that same cyclic and I move it

800

05:08   1   left and right, I'm changing the angles of the blades

05:08   2   as they swing around such that it makes the whole

05:08   3   helicopter roll left and right like this.

05:08   4   And of course, that's how you turn at speed.

05:08   5   If you're going really fast and you go like that,

05:08   6   you'll turn kind of like an airplane, but if you're not

05:08   7   going fast, if you're hovering and you go like that,

05:08   8   the helicopter will go sideways, which airplanes cannot

05:08   9   do and your cars can't either.

05:08   10   So that gives us a special superpower

05:08   11   helicopters have for going sideways. The other

05:08   12   superpower's backwards, of course, when I pull back on

05:08   13   the stick.

05:08   14   Let's go to the next slide.

05:08   15   The pedals. The pedals are interesting in a

05:09   16   helicopter. There's two pedals in the floor. I've got

05:09   17   my feet on them, and they're counterbalanced. If I

05:09   18   push on one, the other one comes up. If I push on the

05:09   19   other one, the first one comes up. So they're always

05:09   20   up and down together.

05:09   21   And those have little push rods going to the

05:09   22   tail rotor. And when you push on those two pedals

05:09   23   alternatively, it changes the angle of the little

05:09   24   blades in the tail rotor. And so it makes it steeper

05:09   25   or shallower.

801

05:09   1   And what that does is, depending on if you

05:09   2   make it steeper or shallower, if you push on the right

05:09   3   one, it makes the helicopter turn this way. Push on

05:09   4   the left one, it turns this way. So that's how you

05:09   5   change the orientation of the helicopter, which we call

05:09   6   yaw, shown up there.

05:09   7   And let's go to the last slide in this

05:09   8   tutorial.

05:09   9   The collective. That's the parking brake-like

05:09   10   machine in my left hand. It actually has two purposes.

05:09   11   It's got a throttle grip like on a motorcycle, except

05:09   12   it's here in my left hand which is a little different.

05:09   13   And that's how I adjust the engine speed.

05:09   14   And then more important, I can pull up and

05:09   15   push down on the collective. And if I pull up, all the

05:10   16   blades on the helicopter become steeper. So that makes

05:10   17   the helicopter go up. And if I push down, the whole

05:10   18   helicopter goes down.

05:10   19   So you can imagine flying a helicopter is this

05:10   20   dance where you're moving your legs, your left hand and

05:10   21   your right hand constantly. If you're flying an

05:10   22   airplane like I fly, I can let go of the controls, open

05:10   23   up some M&Ms, pop them in my mouth and grab the

05:10   24   controls again and nothing will go wrong. You cannot

05:10   25   touch a bag of M&Ms when you're flying a helicopter.

05:10 1   Everything's busy.

05:10 2   Q.   And you mentioned push rods. Are the controls

05:10 3   always linked directly to -- mechanically linked to the

05:10 4   rotors and all the other systems?

05:10 5   A.   In old-time helicopters, they are. In ones

05:10 6   that have autopilots, then there's ways often to

05:10 7   have -- and you heard the term before -- fly-by-wire

05:10 8   technology, which means as you move the controls,

05:10 9   there's sensors detecting where the controls are and

05:10 10 sending through wires the signals.

05:11 11   Fly-by-wire means there's a wire; it's not a

05:11 12 remote-control car. It means that you're still in the

05:11 13 helicopter. You're still controlling it with the same

05:11 14 controls, but the controls go through a computer.

05:11 15   In fact, some cars have that now. They have

05:11 16 fly-by-wire brakes and steering wheels in some high-end

05:11 17 cars now, which scares me. I want mechanical linkages.

05:11 18 I want my steering wheel to go straight to the gear box

05:11 19 that turns my wheels.

05:11 20   But there are cars now that have fly --

05:11 21 drive-by-wire it's called. That doesn't mean I'm

05:11 22 remote controlling my car from my living room. That

05:11 23 means I'm in the car, turning the steering wheel, but

05:11 24 there's electronics that decide how to turn the

05:11 25 steering -- the wheels.

803

05:11   1   Q.   Thank you for that.

05:11   2   Why don't we turn to Claim 13?

05:11   3   Can you provide just a general overview of

05:11   4   kind of how this claim's laid out?

05:11   5   A.   Sure. And the good news is there's one claim.

05:11   6   So this is a single-claim infringement opinion, which

05:11   7   is nice.

05:11   8   So the first thing I want you to know, now

05:11   9   that we just covered the controls of the helicopter,

05:11   10   I've highlighted these four things here. Because the

05:12   11   architecture of this claim is just broken into four

05:12   12   parts.

05:12   13   One is all about what happens when the

05:12   14   helicopter's moving forward and backward to stay safe.

05:12   15   The second part here, what happens when the

05:12   16   helicopter's going sideways, being told to go sideways.

05:12   17   Third part, what happens when you turn left

05:12   18   and right like this to change orientation.

05:12   19   And the fourth part, what happens when you

05:12   20   pull up and down on the collective in terms of going up

05:12   21   and down.

05:12   22   So the whole claim is really just, like, four

05:12   23   little claims.

05:12   24   Q.   And these -- the things you highlighted refer

05:12   25   to loops. What are the relevance of having control

804

05:12 1   loops?

05:12 2   A.   Well, any time you control any kind of

05:12 3   autopilot system in a helicopter, there's these things

05:12 4   called control loops. They're basically the automatic

05:12 5   systems that do what you need done.

05:12 6   So if you have an autopilot on and you tell

05:13 7   the helicopter to hover -- and every helicopter with an

05:13 8   autopilot has had loops and has had autopilot hover for

05:13 9   the last 30 years so this is not new.

05:13 10   But when you tell a helicopter to hover, it's

05:13 11 the control loops that do that for you. The computer

05:13 12 is very quickly deciding how do I turn these blades so

05:13 13 that I don't drift from east to south or to west or

05:13 14 anything like that, and how do I spin these blades so I

05:13 15 don't go out of balance and crash. Loops are just

05:13 16 doing that for you.

05:13 17   Q.   Now, does Claim 13 simply require having

05:13 18 control loops?

05:13 19   A.   No. Claim 13 is really interesting because

05:13 20 it's not about how you write the loops. It's not about

05:13 21 implementing these loops that are well-known. They've

05:13 22 been in helicopters forever, like I said.

05:13 23   It's about when you turn which loops on and

05:13 24 off. It's about how you should have the helicopter

05:13 25 behave when you push on the controls, when you let go

805

05:13 1   of the controls. That's what it's about

05:13 2   architecturally.

05:13 3   Q.   Before we get into all the loops, they look a

05:13 4   little complex, but can we start with the preamble?

05:14 5   A.   Yes. Let's go to the next slide.

05:14 6   So, again, when I'm starting to evaluate the

05:14 7   claim, the first part says: A flight control system

05:14 8   for rotary aircraft. So we know it's a control system.

05:14 9   Fine.

05:14 10   Then it says -- after it says rotary aircraft,

05:14 11 it's defining what kind of rotary aircraft. This is

05:14 12 the same thing as that. So it's saying the rotary

05:14 13 aircraft having these four things: A longitudinal

05:14 14 controller, a lateral controller, a directional

05:14 15 controller, a vertical controller.

05:14 16   So now we know we're talking about things like

05:14 17 helicopters that have those four controllers.

05:14 18   Q.   Now, Dr. Michalson states that DJI products

05:14 19 meet this requirement based on the remote control.

05:14 20   Do you agree?

05:14 21   A.   No. I do not.

05:14 22   Q.   Why not?

05:14 23   A.   Because you got to -- we got to look at the

05:14 24 words again, right? And I remember at one point on

05:14 25 cross-examination he was asked to hold up the aircraft

806

05:15   1   and he held this up. This is the aircraft. This is a

05:15   2   rotary aircraft.

05:15   3   So this rotary aircraft here needs to have

05:15   4   these four controllers, and we know the four

05:15   5   controllers are these things. They're the controls.

05:15   6   And this doesn't have them. It's not

05:15   7   fly-by-wire, and it's not something that has

05:15   8   controllers that a very small person can sit inside and

05:15   9   control. So, therefore, DJI aircraft doesn't meet this

05:15   10   preamble, in my opinion.

05:15   11   Q.   And I believe you showed a picture of aircraft

05:15   12   earlier; is that right?

05:15   13   A.   Yes.

05:15   14   Q.   Can you show us again where are the

05:15   15   controllers in that aircraft?

05:15   16   A.   Absolutely. You can see them here. There's

05:15   17   the cyclic, there's the collective. You can see just

05:15   18   the hint of one of the pedals here. There's another

05:15   19   cyclic.

05:15   20   Q.   And what's the picture on the right showing?

05:15   21   A.   The picture on the right is me by the river

05:16   22   here flying a DJI drone. The drone is the aircraft.

05:16   23   It's here. The controls that I'm using, if you want to

05:16   24   think of controllers that way, are right here at my

05:16   25   fingertips.

05:16   1   Q.   Now, Dr. Michalson stated that you're

05:16   2   inserting the word "manned" into this limitation.

05:16   3   Do you agree?

05:16   4   A.   No.   I'm not inserting the word "manned"

05:16   5   anywhere into here.   I'm simply reading the preamble

05:16   6   and interpreting it as an expert.   Because I know what

05:16   7   the controllers are and I know what a rotary aircraft

05:16   8   is, and I can read.

05:16   9   Q.   You would agree the claim doesn't say

05:16   10 "manned," right?

05:16   11   A.   Correct.

05:16   12   Q.   What word is it that requires the aircraft to

05:16   13 have the controllers?

05:16   14   A.   This section.

05:16   15   Q.   Now, Dr. Michalson also states that this

05:17   16 limitation, if it's not literally met, it's met under

05:17   17 the doctrine of equivalents.

05:17   18   Do you agree?

05:17   19   A.   I do not.

05:17   20   Q.   Why not?

05:17   21   A.   Let's go to the next slide.

05:17   22   What Dr. Michalson's suggesting is, well, it

05:17   23 doesn't matter if the controllers are inside the

05:17   24 aircraft or if I'm standing out here controlling the

05:17   25 helicopter from afar.   It just doesn't matter.   It's

808

05:17   1   the same thing.

05:17   2   And I strongly disagree, and there's a whole

05:17   3   bunch of reasons for that. First of all, if we go back

05:17   4   to this whole idea of brownout, brownout is a problem

05:17   5   because when all of this dust whips up, the pilot can't

05:17   6   see what they're doing.

05:17   7   We don't have a brownout issue in drones. I'm

05:17   8   standing here. The drone is somewhere else. I can see

05:17   9   the drone, and I fly the drone.

05:17   10   Furthermore, brownout is an issue because we

05:17   11   need good inventions to keep pilots safe even in bad

05:17   12   conditions like that. But with drones, I don't fly in

05:17   13   bad conditions. I don't do emergency rescue work in

05:18   14   fog on the highway to pick up a patient. That's just

05:18   15   not what you use them for.

05:18   16   Third of all, when you are talking about

05:18   17   having controls, right, the rotary aircraft having

05:18   18   controls, the controls control the rotary aircraft in

05:18   19   its frame -- in its framework. The cyclic goes

05:18   20   forward, the helicopter goes forward.

05:18   21   When I'm controlling a drone, the drone's up

05:18   22   here. I'm somewhere else. If I have the controls,

05:18   23   they don't behave the same way at all. I can have the

05:18   24   drone pointed at me and I'm thinking about turning

05:18   25   left. I can get all confused about whether it's my

809

05:18   1   left or the drone's left.

05:18   2   You don't have that problem in a helicopter

05:18   3   because you are one and the same. The controls are in

05:18   4   the helicopter. They're had by the helicopter.

05:18   5   So those are all reasons why controlling a

05:18   6   drone that way is completely different.

05:18   7   And last but not least, the idea of remote

05:18   8   control, it's a great toy. It's very useful to control

05:18   9   something. There's some delays, there's some lags. It

05:18   10 is nothing like the real-time controls you have in a

05:19   11 real helicopter, whether it's fly-by-wire or mechanical

05:19   12 linkages, where when you move that control, you have

05:19   13 instant responses in this thing that you're surrounded

05:19   14 by is responding to you.

05:19   15   Q.   Why can't the fly-by-wire just be

05:19   16 fly-by-wireless?

05:19   17   A.   Fly-by-wire is a term of art. We know what it

05:19   18 means in the trade of helicopter and airplane design.

05:19   19 And it's really important that the digital electronics

05:19   20 are carrying the signal at the speed of light, exactly

05:19   21 what you want is getting to that motor.

05:19   22   When they started doing drive-by-wire, they

05:19   23 had to be super careful that it's a careful redundant

05:19   24 system that will never fail. Because if that fails,

05:19   25 lives will be lost. Here we're talking about a simple

810

05:19   1   remote control. If there's some interference near an

05:19   2   AM radio antenna somewhere and it doesn't work, the

05:19   3   drone falls down and crashes. Nobody dies.

05:19   4   The safety requirements you have for

05:19   5   fly-by-wire and for mechanical linkages have nothing to

05:20   6   do with the safety requirement here.

05:20   7   Q.   Are drones designed to be flown in brownout or

05:20   8   fog or other similar conditions?

05:20   9   A.   They're not even designed for that, no.

05:20   10   Q.   How do you know that?

05:20   11   A.   Well, we can look at the user's manual. The

05:20   12   Mavic and Phantom user manuals actually say do not use

05:20   13   in snow, rain and fog. Do not fly on rainy days and

05:20   14   smoggy days or if there's no line of sight.

05:20   15   And what's more, the Federal Aviation

05:20   16   Administration, the FAA regulations, prohibit me from

05:20   17   flying this if I can't see it. I have a drone

05:20   18   operator's license. I'm not allowed to fly this if

05:20   19   there's fog and rain and I can't see it. I'm not even

05:20   20   allowed to fly it if it gets far enough away that I

05:20   21   can't make out what it's doing. That's illegal.

05:20   22   So all those instrument conditions in which we

05:20   23   fly airplanes and helicopters, you can't even touch

05:20   24   your drone in those situations.

05:21   25   Q.   And just to be clear for the record, when you

811

05:21   1   say "this," are you referring to the drone?

05:21   2   A.   Yes.

05:21   3   Q.   And that top quote, is that from Defendants'

05:21   4   Exhibit 444 that's in your binder?

05:21   5   A.   Yes.

05:21   6   MR. SCHLESINGER: DJI moves to admit

05:21   7   Exhibit 444.

05:21   8   MR. RICH: No objection.

05:21   9   THE COURT: Admitted.

05:21 10   BY MR. SCHLESINGER:

05:21 11   Q.   And then the bottom quote, is that from

05:21 12   Defendants' Exhibit 455?

05:21 13   A.   Yes.

05:21 14   MR. SCHLESINGER: DJI moves to admit

05:21 15   Exhibit -- Defendants' Exhibit 455.

05:21 16   MR. RICH: No objection.

05:21 17   THE COURT: Admitted.

05:21 18   BY MR. SCHLESINGER:

05:21 19   Q.   Let's return back to Claim 13.

05:21 20   It looks like on this slide you have a few

05:21 21   different highlights.

05:21 22   Could you explain those, please?

05:21 23   A.   Yes. I wanted you all to know what this

05:21 24   detent language is all about for your deliberations

05:21 25   too. I've highlighted in yellow and green.

812

05:21   1   Architecturally, we talked about how this

05:21   2   claim is really, like, four mini-claims after the first

05:22   3   part we just talked about that I've struck out:

05:22   4   Left/right, forward/backward, up/down and turning.

05:22   5   But there's another way this kind of divides

05:22   6   things up. Because remember, it's all about when you

05:22   7   turn autopilot on and off. That's what the whole claim

05:22   8   is about, is when should you turn autopilot on, when

05:22   9   should you turn it off and how.

05:22   10   So it says return to detent, out of detent,

05:22   11 return to detent, out of detent. What it's saying is

05:22   12 every time it says return to detent, it's saying when

05:22   13 the pilot lets go of the controls.

05:22   14   So it describes what should happen if the

05:22   15 pilot just lets go of the controls, how should the

05:22   16 helicopter stay safe?

05:22   17   And then in all the blue cases, out of detent,

05:22   18 it's saying what should happen when the pilot takes the

05:22   19 controls and moves them.

05:22   20   So the whole claim is kind of built up around

05:22   21 that. What should happen when you let go? What should

05:22   22 happen when you take back over manually and do

05:22   23 something.

05:22   24   Q.   Why don't we focus in on the first loop?

05:23   25   A.   Sure. Let's go to the next slide for that,

813

05:23 1   please.

05:23 2   Q.   That's the longitudinal loop design, correct?

05:23 3   A.   Yes.

05:23 4   So we'll just kind of talk through that. And

05:23 5   remember, there's two versions of this.

05:23 6   First of all, longitudinal loop. We're

05:23 7   talking about this, going forward and backward in a

05:23 8   helicopter, and we're talking about the cyclic stick.

05:23 9   You're pushing forward and backward. Forward is

05:23 10   forward, backward is backward. That's the case we're

05:23 11   talking about.

05:23 12   So the two things here are going to be what

05:23 13   happens when you push on the stick and what happens

05:23 14   when you let go of the stick, just in the

05:23 15   forward/backward direction.

05:23 16   Q.   And which two things are you referring to

05:23 17   just --

05:23 18   A.   This one and this one.

05:23 19   Q.   So the first wherein and the second wherein

05:23 20   clause of the longitudinal loop design?

05:23 21   A.   And let's start with this one, this second

05:23 22   one, which is the second wherein clause that's

05:23 23   highlighted right now.

05:23 24   So here, we're going to say is: When I push

05:23 25   on the helicopter stick, what happens?

814

05:23   1   That's what this limitation's going to explain

05:23   2   to us. So let's look at it in detail.

05:23   3   Clear annotation. So we're looking at this

05:24   4   one and only this one to start.

05:24   5   So it's saying here when the controller is out

05:24   6   of the detent, that means when I push on the stick, and

05:24   7   it says what should happen is the longitudinal

05:24   8   maneuverability of the rotary aircraft is controlled by

05:24   9   either pitch attitude loop or pitch rate loop.

05:24   10   So it's a recipe, and it's saying one of two

05:24   11   things has to happen to meet this limitation. When you

05:24   12   push on that stick, the helicopter should either be

05:24   13   controlled by pitch attitude loop or be controlled by

05:24   14   pitch rate loop.

05:24   15   So now I have to explain to you what those two

05:24   16   phrases mean, "pitch attitude loop" and "pitch rate

05:24   17   loop," so you can decide if that applies to the drone

05:24   18   or not.

05:24   19   Let's go to the next slide.

05:24   20   So this is the last tutorial, I promise, I

05:24   21   think.

05:24   22   So now we have to figure out what is pitch

05:25   23   attitude and what is pitch rate. And again, I have to

05:25   24   have a model because it's so much easier to describe it

05:25   25   with this model.

815

05:25   1   In a helicopter, one of the things that can

05:25   2   happen is you push forward on that stick and you're

05:25   3   controlling attitude or pitch attitude.

05:25   4   What that means is every inch I push the stick

05:25   5   further forward, it changes the helicopter in this kind

05:25   6   of special autopilot mode to be, let's say, 10 degrees

05:25   7   more pitched forward. And if I hold the stick forward

05:25   8   an inch, it's going to stay at 10 degrees.

05:25   9   If I now push it forward 2 inches, it's going

05:25   10   to go 20 degrees. It's just going to stay at

05:25   11   20 degrees. It's rock solid. Come back an inch, it's

05:25   12   going to go back to 10 degrees. That's pitch attitude.

05:25   13   So if I hold that stick steady, the pitch of

05:25   14   the helicopter's not going to change at all. It's

05:25   15   going to stay the same. That's Option No. 1.

05:25   16   Option No. 2 is pitch rate loop. Pitch rate

05:25   17   loop says, when I push that stick forward an inch, it's

05:25   18   going to start changing its angle at some rate like

05:26   19   this. I better not hold it there very long, because if

05:26   20   I hold it there longer than a few seconds, I'm done.

05:26   21   I'm finished flying helicopters.

05:26   22   If I push it forward 2 inches, it's going to

05:26   23   be twice as fast. So I better hold it there even less

05:26   24   time.

05:26   25   So pitch rate is very touchy controls, right?

816

05:26   1   You push it, you better not hold it there very long at

05:26   2   all, because it's going to just go faster and faster

05:26   3   and faster.

05:26   4   So pitch attitude is a fixed angle; pitch rate

05:26   5   is something else altogether. It's a fixed speed of

05:26   6   change.

05:26   7   Q.   Why would a helicopter have a pitch rate

05:26   8   control?

05:26   9   A.   It's not very frequently used, but the reason

05:26   10   you use that kind of control is -- in an autopilot is

05:26   11   in the military helicopter. If you want to take fast

05:26   12   evasive action, this is going to be the fastest way to

05:26   13   get out of trouble.

05:26   14   So if you're low and you're doing some

05:26   15   emergency maneuvers and somebody shoots a missile at

05:26   16   you or something, you pull on that at pitch rate, it is

05:27   17   going to very, very quickly go up, because it's going

05:27   18   to change its attitude really rapidly.

05:27   19   Q.   And the DJI drones are accused of practicing

05:27   20   Claim 13, right?

05:27   21   A.   They are.

05:27   22   Q.   How are DJI drones controlled?

05:27   23   A.   Neither one of these. So let's put the

05:27   24   helicopter aside for a second and bring up the drone.

05:27   25   And the DJI drone, in the accused modes that

—817—

05:27 1   Textron's been talking about, this right stick, as

05:27 2   Dr. Michalson showed you, when you push forward on it,

05:27 3   it makes the helicopter go forward. You push back,

05:27 4   makes the helicopter go backward.

05:27 5   Q.   You're referring to helicopter. You mean --

05:27 6   A.   I'm so sorry. When you push forward on this

05:27 7   stick, it makes the drone go forward. When you pull

05:27 8   back, it makes the drone go backward. I thought

05:27 9   switching machines might get my words right.

05:27 10   And the interesting thing is in the DJI

05:28 11   system, to make it easy to fly, the more I push this

05:28 12   stick forward, the faster it goes. I'm not controlling

05:28 13   pitch attitude, and I'm not controlling pitch rate.

05:28 14   What I'm controlling is the speed of the drone.

05:28 15   So if I push this forward an inch and hold it

05:28 16   there, the helicopter -- the drone will travel at a

05:28 17   certain speed. If I push this stick forward further

05:28 18   and hold it there, it'll just travel faster. If I pull

05:28 19   back the stick, it'll just slow down.

05:28 20   So what I'm doing is I'm controlling speed.

05:28 21   I'm not controlling pitch rate, and I'm not controlling

05:28 22   pitch attitude.

05:28 23   Q.   And the stick you're referring to, which stick

05:28 24   on the remote control?

05:28 25   A.   That was the right stick. The one that I'm

818

05:28   1   pushing forward and backward on the remote control.

05:28   2   Q.   And how do you know that that's what -- how

05:28   3   DJI drones are controlled in the accused modes?

05:28   4   A.   Because I can physically test it. I can read

05:28   5   the software, and I can talk to the engineers. But I

05:28   6   think the most fun thing is to show you how we

05:29   7   physically test it.

05:29   8   Q.   How do you physically test it?

05:29   9   A.   Well, this is interesting. So how can you

05:29   10   figure out how the drone's actually working? And the

05:29   11   nice thing is you can tell in the software, but it's --

05:29   12   I'm from the Show Me state, Missouri. So it's nice to

05:29   13   actually test it yourself and show it to yourself.

05:29   14   So what I did is I -- and this is just an

05:29   15   example here, but of course I did this back home in

05:29   16   Pittsburgh too. Let me clear my annotations.

05:29   17   So I take off, fly the drone up in the sky.

05:29   18   And then with one hand I push forward on the stick and

05:29   19   hold it in the set position. So the drone starts

05:29   20   moving forward like this, right? So it's happy. It's

05:29   21   moving forward. I'm happy.

05:29   22   But then what I do is as it's moving forward

05:29   23   and I'm holding the stick in the same position, I reach

05:29   24   up and I do something kind of mean. I stop it. I put

05:29   25   my finger up and I don't let it go.

05:29   1   Now if I was controlling pitch attitude, like

05:30   2   DJI's accusing in that case, what would happen? It

05:30   3   would just hold that attitude. It would just stop and

05:30   4   stay there.

05:30   5   If I was controlling pitch rate, it would have

05:30   6   broken by now. It would be a crash because it would

05:30   7   have gone like that and hit the ground. So that's not

05:30   8   it.

05:30   9   So instead what happens is when I hold it, it

05:30   10   gets angry at me, increases its pitch and pushes hard

05:30   11   against my finger to keep going at the same speed,

05:30   12   which proves that it's trying to maintain the same

05:30   13   speed. It doesn't care about its attitude one bit. It

05:30   14   is using whatever it can, any means necessary, to

05:30   15   maintain the same speed because I'm giving it the same

05:30   16   command.

05:30   17   I have a little video of that in the next one.

05:30   18   Go ahead and play that, please.

05:30   19   (Video played.)

05:30   20   A.   And maybe we can play that one more time. And

05:30   21   you can see the attitude of the drone change when it

05:30   22   gets to my finger. It almost doubles. And then as

05:30   23   soon as my finger's gone, it reduces the attitude.

05:31   24   All that time I was holding the stick in the

05:31   25   exact same position. So what I'm commanding is speed.

820

05:31   1   I'm not commanding the two things that DJI is accusing

05:31   2   me of commanding in that situation.

05:31   3   BY MR. SCHLESINGER:

05:31   4   Q.   Now, there's other requirements of the

05:31   5   longitudinal loop design as well; is that right?

05:31   6   A.   Correct.

05:31   7   Q.   Can you describe those?

05:31   8   A.   Sure. This is the last part for

05:31   9   forward/backward. So the second part of longitudinal

05:31   10   loop design, we just covered what happens when you push

05:31   11   forward on the stick.

05:31   12   Next part is, is kind of the real autopilot

05:31   13   part which is what happens when you let go of the

05:31   14   stick.

05:31   15   And what the claim says, because remember, in

05:31   16   this claim, the imagined situation is you are pushing

05:31   17   forward on your helicopter. You are in pitch attitude

05:31   18   or pitch rate loop because that's what the part we just

05:31   19   talked about said.

05:31   20   Now you let go. So when you let go, it says

05:32   21   the forward speed hold loop automatically engages. And

05:32   22   Dr. Christensen talked about this. He didn't want you

05:32   23   to have to push a button to engage it. He wanted it to

05:32   24   be automatic so that if a helicopter pilot panics and

05:32   25   lets go, the right thing happens. That's why it says

821

05:32   1   automatically engages. He really wanted it to be

05:32   2   automatic.

05:32   3   So it says: The forward speed hold loop

05:32   4   automatically engages when you're in the detent --

05:32   5   that's when you let go -- when the groundspeed is

05:32   6   outside the groundspeed threshold. So when you're

05:32   7   going fast.

05:32   8   So to sum that up, this part of the claim is

05:32   9   saying helicopter's going real fast, maybe you're

05:32 10   controlling it, right? And you're controlling it with

05:32 11   pitch attitude, let's say, because pitch rate's pretty

05:32 12   dangerous.

05:32 13   You let go. What needs to happen is it stops

05:32 14   being controlled by pitch attitude and switches over to

05:32 15   speed hold automatically engaging.

05:32 16   Q.   How do the DJI drones -- what happens with the

05:32 17   DJI drones when you let go of the stick?

05:33 18   A.   Nothing. Because the DJI drone was already

05:33 19   using speed hold. It was moving exactly at the speed

05:33 20   that I am showing on the joystick. When I let go like

05:33 21   that, I'm just commanding it to move a speed of zero.

05:33 22   It's still in speed mode just like it was before I did

05:33 23   that.

05:33 24   So nothing has to get automatically engaged.

05:33 25   We're not overcoming any buttons. So it just keeps

822

05:33 1   going and slows down because now I'm giving it a speed

05:33 2   of zero.

05:33 3   Q.   What happens when it reaches a stopping point?

05:33 4   A.   That's somewhere where we have a difference of

05:33 5   opinion with Textron. That's important to point out.

05:33 6   When the DJI drone is flying -- and they showed you

05:33 7   videos of this repeatedly -- when I let go, it slows

05:33 8   down and stops. You saw that in the videos. And

05:33 9   that's a great safety feature.

05:33 10   When it does that, the DJI drone actually

05:34 11   holds its position. It grabs hold of its location and

05:34 12   it holds its position in space. And that means that at

05:34 13   that moment, it's not even doing velocity control or

05:34 14   speed hold loop or anything like that. It's just

05:34 15   holding its position over the ground.

05:34 16   Q.   How do you know that?

05:34 17   A.   I know that, again, through testing, through

05:34 18   reading the code, talking to the engineers and going

05:34 19   back and forth. But I think the most interesting way

05:34 20   that you can know that is through testing.

05:34 21   Because if you think about it, if you let go

05:34 22   of the controls and this is just sitting there and it's

05:34 23   doing a speed hold loop, if it's holding a speed of

05:34 24   zero, if I move it a little bit, it'll keep doing a

05:34 25   speed hold loop. I can move it some more. It'll just

823

05:34   1   let me move it, and it'll stay there. It'll keep

05:34   2   having a speed of zero.

05:34   3   But if it's doing a position hold, what will

05:34   4   happen if I move it away? It's going to get angry and

05:34   5   go back. That's right. It's going to get really upset

05:35   6   with me because it's trying to stay in a particular

05:35   7   place.

05:35   8   THE WITNESS: Your Honor, it's a big

05:35   9   request, but it will only take about 60 seconds. Can I

05:35   10 turn it on over there and actually show that to the

05:35   11 jury?

05:35   12   MR. RICH: I'm not sure if it has a

05:35   13 camera on it or -- no objection if it's okay with

05:35   14 Your Honor.

05:35   15   THE COURT: I have no problem with it.

05:35   16   THE WITNESS: Field trip. This is super

05:35   17 fast so I promise it won't be long.

05:35   18   So I am going to go ahead and just turn

05:35   19 it on first on the ground. And turning it on is very

05:36   20 unintuitive. You have to double click the button and

05:36   21 that turns it on. And now I turned on the controller

05:36   22 and the transmitter.

05:36   23   So the next thing that I do is just go

05:36   24 ahead and take off to a hover. So now we're going to

05:36   25 go hover. So it's hovering. And what I'm saying is

824

05:36 1   it's actually holding a position.

05:36 2   And of course we heard repeatedly from

05:36 3   others who said no, no. It's just holding a velocity

05:36 4   of zero. And that troubles me because I can show you

05:36 5   so easily that it's holding a position.

05:36 6   So I'm just going to move it away. It

05:36 7   goes right back. Can you hear how angry it gets at me?

05:36 8   It's like a very angry bumble bee.

05:37 9   So I'll land it again.

05:37 10   Thank you, sir.

05:37 11   That kind of just testing is a really

05:37 12 important way to understand how a system like this

05:37 13 actually operates, and what that shows us is it is not

05:37 14 holding the speed of zero. Quite the contrary. It's

05:37 15 actually taking its time and speeding up to get back to

05:37 16 the original position, which means it's doing position

05:37 17 hold.

05:37 18 BY MR. SCHLESINGER:

05:37 19   Q.   If it was holding a speed of zero, what would

05:37 20 have happened during your test?

05:37 21   A.   It would have just slid in the sky and then

05:38 22 when I let go, it would hold a speed of zero.

05:38 23   Q.   Now, did you review any source code?

05:38 24   A.   Yes.

05:38 25   MR. SCHLESINGER: Your Honor, if we may

825

05:38	1	seal the Court again.
05:38	2	THE COURT: Sure.
05:38	3	(Sealed proceedings.)
05:38	4	BY MR. SCHLESINGER:
05:38	5	Q. And if you could again turn to Defendants'
05:38	6	Exhibit 743.
05:38	7	MR. SCHLESINGER: If we could put it up
05:38	8	on the screen, please.
05:38	9	A. I've got it.
05:38	10	BY MR. SCHLESINGER:
05:38	11	Q. What is this code?
05:38	12	A. This is some of the software for the DJI
05:38	13	drones.
05:38	14	Q. If we could go to Pages 1094 to 1095.
05:39	15	What is this code showing?
05:39	16	A.
05:39	17	
05:39	18	
05:39	19	
05:39	20	
05:39	21	
05:39	22	Q. Is this the same code that Dr. Michalson
05:39	23	referred to yesterday?
05:39	24	A. It is.
05:39	25	MR. SCHLESINGER: Could we put up

05:39	1	Dr. Michalson's Slide 31, please?
05:39	2	BY MR. SCHLESINGER:
05:39	3	Q. And just to confirm, is this the same code
05:39	4	that you were just referring to?
05:39	5	A. Yes. It is.
05:39	6	Q. When the drones are holding a position, are
05:40	7	they -- the DJI drones, are they holding a forward
05:40	8	speed of zero?
05:40	9	A. No.
05:40	10	Q. How do you know that?
05:40	11	A. Because this is the sort of chapter of the
05:40	12	code for when it's holding its position, ▉▉▉▉▉▉
05:40	13	▉▉▉▉▉▉▉▉▉ I know that sounds redundant. By now
05:40	14	you know that there aren't very creative words used to
05:40	15	describe code.
05:40	16	Now I'm going to find the place in this code
05:40	17	where it actually calls it -- here it is. ▉▉▉▉
05:40	18	▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉
05:40	19	▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉
05:40	20	▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉ So it's clearly
05:40	21	not setting a speed of zero. It's telling the drone
05:40	22	stay put, capture your position, and no matter what
05:40	23	happens, come back to this position.
05:40	24	MR. SCHLESINGER: Could we pull up
05:40	25	Claim 13 of the '752 patent?

827

05:41   1   Can you please zoom in on the first two

05:41   2   loop -- actually the beginning down to right before

05:41   3   directional loop design, please?

05:41   4   BY MR. SCHLESINGER:

05:41   5   Q.   Dr. Nourbakhsh, can you summarize why you

05:41   6   believe the DJI drones do not infringe Claim 13?

05:41   7   A.   Yes. Because this section here.

05:41   8   Q.   Which section are you referring to?

05:41   9   A.   I'm sorry. The first wherein clause of

05:41   10 longitudinal loop design says that you need to

05:41   11 automatically engage forward speed hold, but we don't

05:41   12 need to automatically engage it at all because it's

05:42   13 already running. So it can't be engaged.

05:42   14   The second wherein clause says that when you

05:42   15 push on the controller, the aircraft needs to be

05:42   16 controlled by either pitch attitude or pitch rate, but

05:42   17 we aren't controlled by either one. We're controlled

05:42   18 by speed.

05:42   19   And at the very top, it says rotary aircraft

05:42   20 where the rotary aircraft has these controllers. DJI

05:42   21 drones do not have these controllers.

05:42   22   And then we didn't talk about it, but it's

05:42   23 really the same thing for lateral loop design,

05:42   24 specifically for the case of automatically engaged

05:42   25 here. There is no lateral speed hold automatically

828

05:42   1   engaged in the sideways direction for the same reason.

05:42   2   It's already running. It's constantly doing speed.

05:42   3   Q.   Now, what is your opinion with respect to the

05:43   4   doctrine of equivalents for Claim 13?

05:43   5   A.   I believe that we don't infringe under

05:43   6   doctrine of equivalents either.

05:43   7   Q.   And what is your opinion with respect to

05:43   8   indirect infringement for Claim 13?

05:43   9   A.   I don't believe that these drones infringe

05:43   10   based on indirect infringement either.

05:43   11   Q.   And how certain are you of your opinion?

05:43   12   A.   I'm completely confident.

05:43   13   Q.   How can you be so certain?

05:43   14   A.   Well, it's the same thing I said. I've tested

05:43   15   all the drones, really paid attention to the words in

05:43   16   the claims, talked to the engineers who wrote the

05:43   17   source code to understand it, and also looked at the

05:43   18   source code just like I showed you today.

05:43   19   Q.   Now, were you in the courtroom when

05:43   20   Dr. Michalson stated there wasn't enough code for him

05:43   21   to determine how the products worked completely?

05:43   22   A.   I was in the courtroom.

05:43   23   Q.   Was there enough source code for you to

05:43   24   determine your opinions?

05:43   25   A.   Yes.

829

05:43   1   Q.   How can you be so certain, in light of what

05:43   2   Dr. Michalson said?

05:43   3   A.   Well, I heard Dr. Michalson, and of course I

05:43   4   disagree with him in this case because of my limited

05:44   5   experience of using the source code, but source code

05:44   6   comes at many different levels. We've talked about

05:44   7   source code that decides how to spin up and down

05:44   8   motors.

05:44   9   The source code that determines how you send

05:44   10   electricity to an individual motor to spin it is

05:44   11   important, sure. It's essential to this thing flying.

05:44   12   If you didn't have that source in general, it would not

05:44   13   fly. It would be a paperweight.

05:44   14   So there's lots of pieces of source code that

05:44   15   are important, essential, valuable. The question is,

05:44   16   are they at all relevant to understanding this claim,

05:44   17   and they aren't.

05:44   18   The claim is all about what happens with the

05:44   19   autopilot when you push on the stick and let go of the

05:44   20   stick. It's not about how you spin the motor. It's

05:44   21   not about exactly how you hover. It's about when you

05:44   22   turn hovering on and off. It's about when you're in

05:44   23   speed hold and when you're not in speed hold. That's

05:44   24   all. It's a bunch of "when" statements.

05:44   25   And so I know that I saw the source code to

830

05:44 1   answer the question when is speed hold on? When is

05:44 2   speed hold off? When is position held? What happens

05:44 3   when I push the stick? What happens when I let go of

05:45 4   the stick?

05:45 5   That's the source code that I had access to

05:45 6   and of course Textron had access to. I had access to

05:45 7   the same source code.

05:45 8   I didn't have access to how the rotors spin,

05:45 9   and I don't need it. And I'm not interested in that

05:45 10   because it has nothing to do with understanding

05:45 11   infringement of this claim.

05:45 12   Q.   How can you be so certain if you didn't see

05:45 13   that source code?

05:45 14   A.   Because everything in this source code gives

05:45 15   me a complete picture to test all the elements in the

05:45 16   claim, and that's all I need.

05:45 17   Q.   And how did your testing compare to the source

05:45 18   code that you did review?

05:45 19   A.   My testing matched the source code, and that's

05:45 20   important. When you talk to the engineers, look at the

05:45 21   source code and test the machine like we did here, and

05:45 22   they all agree, now you can have really high confidence

05:45 23   that you have a good model for how the thing works.

09:42 24   (Sealed proceedings end.)

05:45 25   THE COURT: Counsel, how much time do you

05:46   1   have left with this witness?

05:46   2   MR. SCHLESINGER: Quite a while,

05:46   3   Your Honor.

05:46   4   THE COURT: Ladies and gentlemen, we'll

05:46   5   take our break now for the evening. If you all could

05:46   6   be here by 8:45 in the morning, we will resume tomorrow

05:46   7   morning.

05:46   8   THE BAILIFF: All rise.

05:46   9   (Jury exited the courtroom.)

05:46   10   THE COURT: Thank you. You may be

11   seated.

05:46   12   Doctor, you may step down.

13   THE WITNESS: Thank you, sir.

05:46   14   THE COURT: Okay. Is there anything we

05:46   15   need to take up?

05:46   16   Yes, sir.

05:46   17   MR. MEEK: Your Honor, nothing

05:46   18   controversial. We've talked per your request yesterday

05:46   19   about the scheduling for the rest of the week. We

05:46   20   think it's likely that the evidence will be done

05:46   21   sometime mid afternoon, and then that would leave you

05:47   22   time probably to charge.

05:47   23   If it does get done a little earlier than

05:47   24   that, it's theoretically possible that we could close,
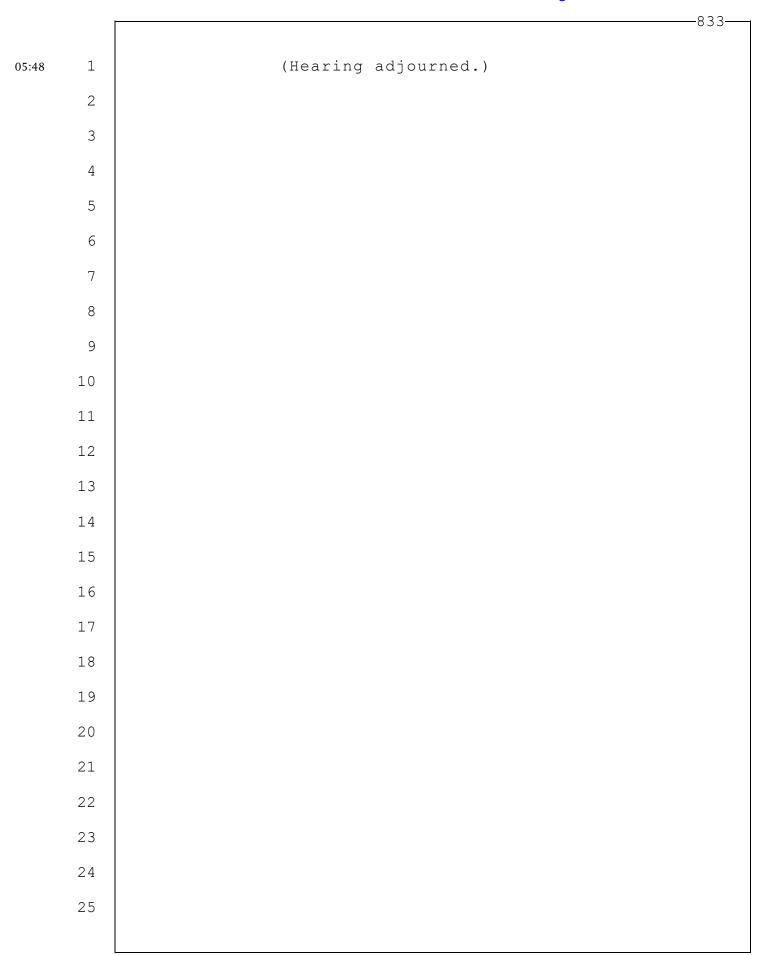
05:47   25   but I think Your Honor doesn't like closing late in the

832

05:47   1   day.

05:47   2   THE COURT: I will defer to you guys. If

05:47   3   you want --

05:47   4   MR. MEEK: What we would prefer is to

05:47   5   just go ahead and set it in stone that we'll close

05:47   6   Friday morning. I think the closings will be much

05:47   7   better because you can --

05:47   8   THE COURT: That's fine with me.

05:47   9   MR. MEEK: Okay. So that's what we'll

05:47   10   plan on. Thanks.

05:47   11   THE COURT: I want to defer to what you

05:47   12   all think's best.

05:47   13   So we'll plan on getting through the

05:47   14   charge tomorrow, and then whenever that ends, it ends.

05:47   15   And we will resume Friday morning at 9:00 with closing

05:47   16   arguments.

05:47   17   Everyone good with that?

05:47   18   MR. MEEK: When will we do the charge

05:47   19   conference?

05:47   20   THE COURT: Right now.

05:47   21   So the folks that need to stay for the

05:47   22   charge conference are just the folks that need to stay

05:47   23   for the charge conference. Everyone's welcome, but no

05:47   24   one else has to.

05:48   25   (Off-the-record discussion.)

833

05:48   1   (Hearing adjourned.)

         2

         3

         4

         5

         6

         7

         8

         9

        10

        11

        12

        13

        14

        15

        16

        17

        18

        19

        20

        21

        22

        23

        24

        25

834

1   UNITED STATES DISTRICT COURT)

2   WESTERN DISTRICT OF TEXAS   )

3

4

5   I, Kristie M. Davis, Official Court

6   Reporter for the United States District Court, Western

7   District of Texas, do certify that the foregoing is a

8   correct transcript from the record of proceedings in

9   the above-entitled matter.

10   I certify that the transcript fees and

11 format comply with those prescribed by the Court and

12 Judicial Conference of the United States.

13   Certified to by me this 30th day of April

14 2023.

15
                              /s/ Kristie M. Davis
16   KRISTIE M. DAVIS
                              Official Court Reporter
17   800 Franklin Avenue
                              Waco, Texas 76701
18   (254) 340-6114
                              kmdaviscsr@yahoo.com
19

20

21

22

23

24

25